DUNGEONS & DRAGONS
SERVICE AND OPERATION MANUAL

DUNGEONS & DRAGONS
THE TYRANT'S EYE
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Stern pinball

WARNING

IMPORTANT HEALTH WARNING: PHOTOSENSITIVE SEIZURES - A very small percentage of people may experience a seizure when exposed to certain visual images, including flashing lights or patterns. Even people with no history of seizures of epilepsy may have an undiagnosed condition that can cause "photosensitive epileptic seizures" due to certain visual images, flashing lights or patterns. Symptoms can include lightheadedness, altered vision, eye or face twitching, jerking or shaking of arms or legs, disorientation, confusion, momentary loss of awareness, and loss of consciousness or convulsions that can lead to injury from falling down or striking nearby objects.

IMMEDIATELY STOP PLAYING AND CONSULT A DOCTOR IF YOU EXPERIENCE ANY OF THESE SYMPTOMS.

ATTENTION! IMPORTANT WARRANTY INFORMATION

The electronics system, node network architecture, mechanical devices and associated software control systems in this pinball machine are designed to work with genuine Stern Pinball accessories and devices.

Installation of non-authorized accessories, lamps, LED's, motors or other devices or modification of electro-mechanical devices may damage the system and may void your warranty.

Stern Pinball machines are assembled in Elk Grove Village, Illinois, USA. Stern Pinball has inspected each game element to ensure it meets our quality standards.

Each pinball machine has unique characteristics that make it a one-of-a-kind American made product. Each will have variations in appearance resulting from differences in the machine's particular wood parts, individual printed art and mechanical assemblies. No playfield is perfectly flat and varies depending on the season. Game play will result in playfield dimpling as the harder steel ball contacts the wood and coating; over time multiple dimples will blend to make them less noticeable. Normal plastic insert crazing (tiny stress cracks) and ghosting (small cloudy areas around insert edges) are often seen in pinball machines, due to a combination of plastic mold stress, pushing of inserts into purposely undersized holes, and heating and breaking of inserts' plastic "skin" when the playfield is sanded.

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Games configured for North America operate on 60 cycle electricity only. These games will not operate in countries with 50 cycle electricity (Europe, UK, Australia).

MANUAL #780-50X8-00
DUNGEONS & DRAGONS LE #500-55X8-01
DUNGEONS & DRAGONS PREMIUM #500-55X9-01

1-800-KICKERS - parts.service@sternpinball.com
www.sternpinball.com - facebook.com/sternpinball

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1. SETUP AND MOVING

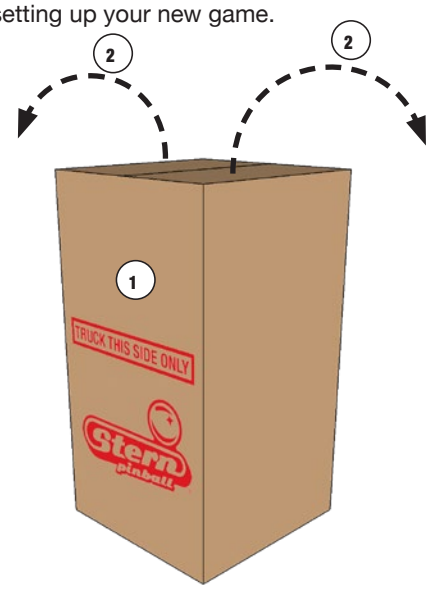
1.1 FIRST-TIME SETUP INSTRUCTIONS

Your brand new Stern Pinball Machine is carefully packed for safety and security. For your safety, exercise caution and use the correct tools and sufficient help when setting up your new game.

TOOLS REQUIRED

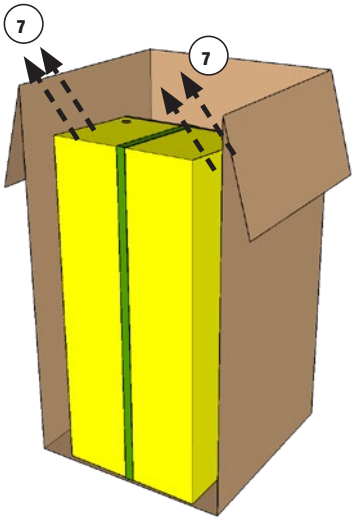
- 5/8” Socket Wrench
- Utility Knife
- Snips
- An Assistant

CAUTION: AT LEAST TWO (2) PEOPLE ARE REQUIRED TO MOVE AND MANEUVER THE GAME. USE PROPER MOVING EQUIPMENT AND EXTREME CARE WHILE HANDLING. STERN PINBALL MACHINES WEIGH OVER 250LBS BOXED.

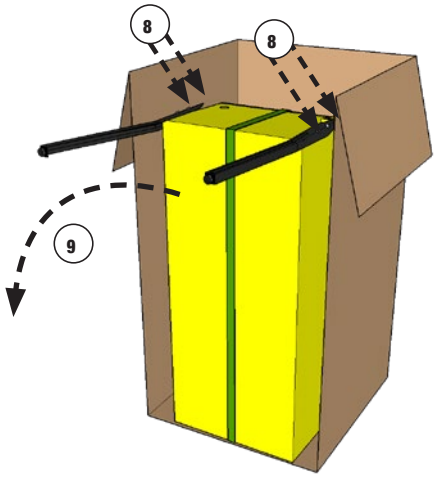


1. Locate the side labeled “TRUCK THIS SIDE ONLY”. The bottom of the game faces this side.
2. Open the top box flaps by pulling hard in an upward motion on each flap. If the flaps are taped, cut the tape first, taking care to avoid the box staples.

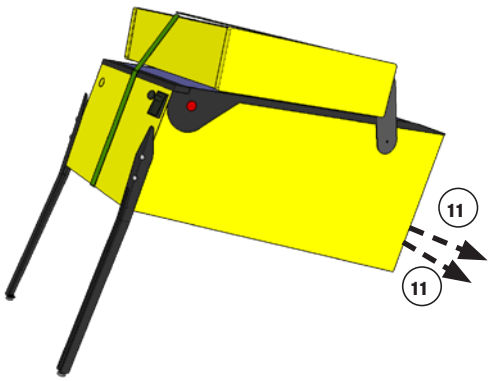
3. Remove the four (4) foam pieces and two (2) narrow box tubes which contain the four (4) identical legs with levelers.
4. DO NOT CUT STRAPPING YET. Keep backbox secured in the down position.
5. With the utility knife, carefully cut down the left and right corners of the box.



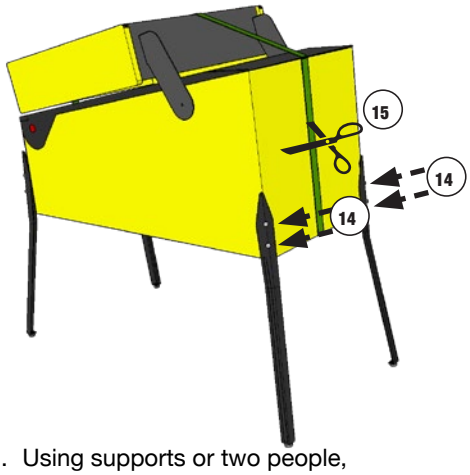
6. Let the face fall forward and remove the entire side by carefully cutting the bottom.
7. With the game still in its folded position, use a 5/8” wrench to loosen and remove the 2 leg bolts on each side of the front cabinet. Ensure the leg levelers are screwed all the way into the legs.



8. Install front legs using the bolts removed from the cabinet. Secure tightly.
9. Have someone help you carefully set the game down on the front legs.



10. Set aside the open box.
11. With a 5/8” socket wrench, loosen and remove the 2 leg bolts on each side of the rear cabinet, 4 total.



12. Using supports or two people, prop the rear of the cabinet up.
13. Ensure the rear leg levelers are screwed all the way into the legs.
14. Install rear legs using the 4 bolts removed from step 11.

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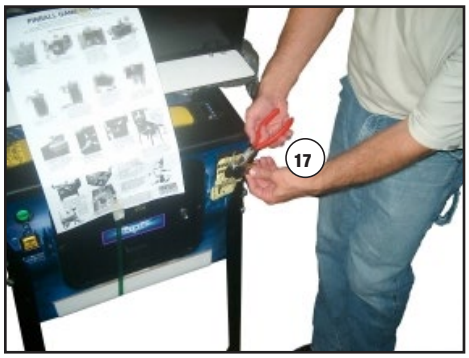
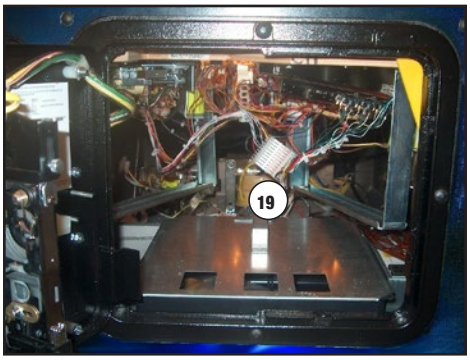
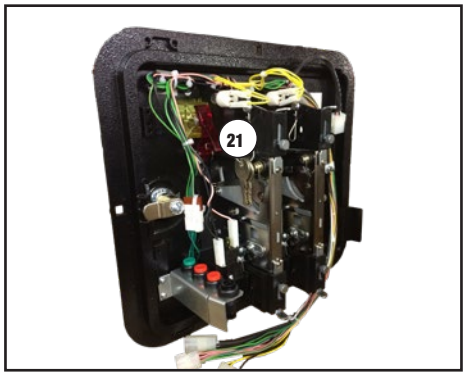
FIRST-TIME SETUP CONTINUED



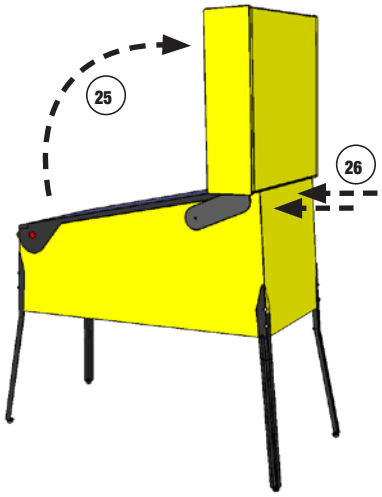
15. Cut nylon strapping and remove protective strap corner guards.
16. Locate the factory keys, either on the shooter rod or taped to the playfield glass.
17. Using snips, cut the tie-wrap securing the keys if required. One set of keys is for the front coin door, the other set of keys is for accessing components in the backbox.



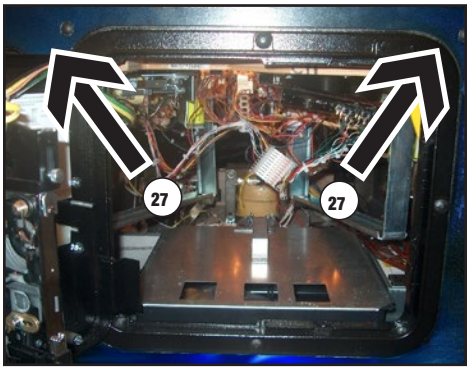
18. Open the front coin door.
19. Reach into the game and remove the retaining clip at the rear of the cash box.
20. Remove the cash box lid by sliding it toward you.



21. Store the backbox keys, if desired, on the metal hook located in the coin door.
22. Locate and remove the pinballs, plumb bob, and backbox bolts from the cash box.
23. Replace the cash box lid and retaining clip for future use.



24. Locate the two (2) backbox bolts in the cash box.
25. Carefully raise backbox to upright position while ensuring that cables are not pinched.
26. Use the 5/8” wrench to Install the two (2) backbox bolts to secure the backbox as indicated on the back of the cabinet.



27. Reach inside the cabinet and lift the two latches located on either side of the coin door.
28. Remove the front top molding.

29. Remove the playfield glass by sliding it toward you and carefully place it in a safe location. Remove all playfield shipping tie downs, shipping blocks, and packing foam, and follow any game-specific unpacking instructions included in the playfield, if present.

CAUTION: PLAYFIELD GLASS IS MADE FROM HIGH-STRENGTH TEMPERED GLASS. TEMPERED GLASS IS SENSITIVE TO EXTREME TEMPERATURE SHIFTS AND CORNER NICKS, WHICH CAN CAUSE THE GLASS TO FAIL CATASTROPHICALLY. TAKE CARE TO STORE THE GLASS ON A SOFT, ROOM-TEMPERATURE SURFACE AND PREVENT THE CORNERS FROM BEING DAMAGED.

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FIRST-TIME SETUP CONTINUED

30. If pinballs were already installed into the lower ball trough, remove them before lifting the playfield.
31. Grasp the lower arch between the flippers, and firmly but gently pull directly up to raise the playfield 8 to 12 inches.
32. While holding the playfield up, pull the playfield toward you until the two playfield supports are over the front edge of the cabinet.
33. Rest the playfield on the front edge of the cabinet.
34. Raise the playfield and rest it against the backbox.
35. Visually inspect all cabinet cables and connector terminations; ensure no wires or cables are pinched and that cable harnesses are not pulled tight.
36. Locate the plumb bob in the parts bag in the cash box.
37. Slide plumb bob onto the hanger wire. Note: the vertical position of the plumb bob affects tilt sensitivity - higher makes the game more sensitive to tilting.
38. Tighten the thumb screw finger-tight.
39. Install the correct number of pinballs. Refer to the decal on the lock down assembly for the correct number of pinballs.

LOCATING, LEVELING, AND FINAL SETUP

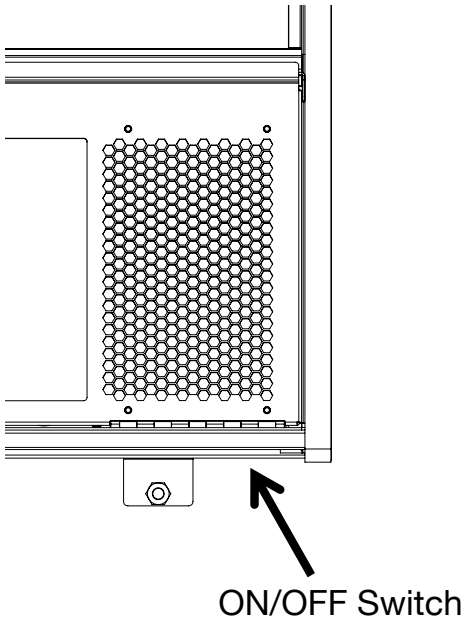
1. Select a location that is indoors, out of direct sunlight, and climate controlled. Excessive moisture/humidity can cause long-term damage to your game.
2. Adjust the front or rear levelers as necessary to position the playfield level bubble, located on the front right of the playfield next to the shooter lane, to float between the two (2) black lines. This will place the playfield at the recommended 6.5° pitch. Playfield angles greater than 6.5° can be achieved by turning out the rear leg leveler(s) for increased difficulty and faster gameplay.
3. Use a pinball to roll down the center of the playfield for side-to-side leveling, or use an external bubble level, digital level, or smartphone level app.
4. Plug into a grounded outlet and check for proper operation through DIAGNOSTICS.
5. Check the coin door: With the door closed, insert coins to verify proper operation.
6. Play game: Check for satisfactory operation and adjust game volume (push the Red Buttons inside the Coin Door).
7. If desired, perform any game diagnostics, game adjustments, and pricing settings at this time.

SPIKE PINBALL SOFTWARE UPDATE INSTRUCTIONS

1. Obtain game software update file (filename ends in ".spk") from www.sternpinball.com or from authorized Stern distributor.
2. Place game software update file (".spk") in root directory of a blank FAT32-formatted USB flash drive (NTFS Format will also work)
3. Use backbox power switch to turn off game
4. Plug in USB flash drive to CPU board USB connector (CN9).
5. Turn on game
6. The game will automatically begin software update
7. Select the correct .spk update file from list.
8. Press Enter on the service switches to start update
9. When the display indicates "Update Complete", turn off game
10. Remove USB flash drive from CPU board
11. Turn game on to complete the update and play pinball!
12. Detailed instructions and troubleshooting tips are available in the game manual, www.sternpinball.com and authorized Stern distributors.
13. If the game is connected to the internet, and registered to an Insider Connected acccount, the software can be automatically downloaded and installed.

POWER SWITCH

The game's power switch is located on the right-hand side underneath the backbox.



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1.2 ADJUSTMENTS MENU

STANDARD ADJUSTMENTS

Perform the below steps to review the adjustments.

Enter the Service Menu, then enter the Standard Adjustments Menu.

Press SELECT to access the Service Menu. Press BACK to exit or escape at any time.

Press [>]. Go to the ADJ icon. Press SELECT.

Go to the S.P.I. icon. Press SELECT.

STANDARD ADJUSTMENT #1 appears with the adjustment name flashing. While the adjustment name is flashing press [<] [>] to move between adjustments.

To change the adjustment setting press SELECT. While the adjustment setting is flashing, press [<] [>] repeatedly until the desired setting appears. Press the SELECT button to "install" the change. The adjustment comment (bottom line) will indicate if the factory default setting is selected or will display INSTALLED if the change is not a factory default setting.

ID	Adjustment Name	Default Setting
1	FREE PLAY	NO
2	GAME PRICING	USA 11
3	REPLAY TYPE	AUTO
4	REPLAY PERCENTAGE	10%
5	REPLAY AWARD	CREDIT
6	REPLAY LEVELS	1
7	AUTO REPLAY START	150,000,000
8	DYNAMIC REPLAY START	150,000,000
9	REPLAY LEVEL #1	150,000,000
10	REPLAY LEVEL #2	175,000,000
11	REPLAY LEVEL #3	225,000,000
12	REPLAY LEVEL #4	350,000,000
13	REPLAY BOOST	YES
14	SPECIAL LIMIT	1
15	SPECIAL PERCENTAGE	10%
16	SPECIAL AWARD	CREDIT
17	FREE GAME LIMIT	5
18	EXTRA BALL LIMIT	5
19	EXTRA BALL PERCENTAGE	25%
20	MATCH PERCENTAGE	9%
21	MATCH AWARD	CREDIT
22	BALLS PER GAME	3
23	MAX PLAYERS PER GAME	4
24	TILT WARNINGS	2
25	TILT DEBOUNCE	750
26	CREDIT LIMIT	30
27	REMOVE FRACTIONAL CREDITS	NEVER
28	ALLOW HIGH SCORES	YES
29	HIGH SCORE AWARD	CREDIT
30	GRAND CHAMPION AWARDS	1
31	HIGH SCORE #1 AWARDS	0
32	HIGH SCORE #2 AWARDS	0
33	HIGH SCORE #3 AWARDS	0
34	HIGH SCORE #4 AWARDS	0
35	GRAND CHAMPION SCORE	60,000,000
36	HIGH SCORE #1	50,000,000
37	HIGH SCORE #2	40,000,000
38	HIGH SCORE #3	30,000,000
39	HIGH SCORE #4	25,000,000
40	HSTD INITIALS	3 INITIALS
41	HSTD RESET COUNT	2000
42	LANGUAGE	ENGLISH
43	PLAYER LANGUAGE SELECT	YES
44	CUSTOM MESSAGE	ON
45	KNOCKER VOLUME	NORMAL
46	START GAME ON CREDIT	OFF
47	START BUTTON BEHAVIOR	ALL LOGGED IN
48	GAME RESTART	YES
49	GAME MODE ON START	STANDARD
50	INSIDER LOGIN TIMER	30
51	INSIDER PLAY AGAIN TIMER	20
52	USE INSIDER HOME TEAM	NEVER
53	ENABLE HOME TEAM IN COINPLAY	NO
54	HOME TEAM GUEST RETENTION	UNTIL POWER OFF
55	DISPLAY MESSAGE OF THE DAY	YES
56	START BUTTON ATTRACT MODE ILLUM.	BLINKING
57	ALLOW LEFT+START TO END GAME	ALWAYS
58	BALL SAVE TIME	0:12
59	TARGET GAME TIME	1:45
60	TIMED PLUNGER	OFF
61	FLIPPER BALL LAUNCH	OFF
62	COINDOOR BALL SAVER	NO
63	COMPETITION MODE	NO
64	Q24 OPTION	COIN METER
65	TICKET DISPENSER	NONE
66	PLAYER GAME MODE	YES
67	PLAYER COMPETITION MODE	YES
68	PLAYER CHALLENGE MODE	YES
69	PLAYER COOPERATION MODE	YES
70	DJ MIXER MODE	YES
71	DJ MIXER PLAYLIST MODE	ORDERED PLAYBACK
72	DJ MIXER PLAYLIST REPEAT	YES
73	LOCATION ID	0
74	GAME ID	0
75	TIME FORMAT	12-HOUR
76	PRICING FORMAT	STANDARD
77	CREDIT FORMAT	REDUCED FRACTION
78	COIN INPUT DELAY	30
79	COIN ACCEPTOR	MECHANICAL
80	LOST BALL RECOVERY	YES
81	COIN DOOR DISABLE TILT	NO
82	COIN DOOR OPEN NODEBUS POWER	YES
83	PLAY ATTRACT TUTORIAL VIDEOS	YES
84	FRONT VOLUME KNOB	HEADPHONES VOL. ONLY
85	MUTE IF HEADPHONES DETECTED	YES
86	MUTE KNOCKER IF HP DETECTED	NO
87	DISABLE Q24 KNOCK IF HP DETECTED	NO
88	GI LED BRIGHTNESS	100%
89	GI LED MAX BRIGHTNESS	255
90	INSERT LED BRIGHTNESS	100%
91	INSERT LED MAX BRIGHTNESS	255
92	FLASHER LED BRIGHTNESS	100%
93	FLASHER LED MAX BRIGHTNESS	255
94	CABINET LED BRIGHTNESS	100%
95	LCD DISPLAY BRIGHTNESS	7
96	ATTRACT MODE B.BOX BRIGHTNESS	100%
97	GAME PLAY B.BOX BRIGHTNESS	100%
98	SERVICE MENU B.BOX BRIGHTNESS	5%

FEATURE ADJUSTMENTS

Each table has feature adjustments specific to the characteristics of that game. To access feature adjustments enter the Service Menu and then enter the Adjustments Menu.

Press SELECT to access the Service Menu. Press BACK to exit or escape at any time.

Press [>]. Go to the ADJ icon. Press SELECT.

Go to the game icon. Press SELECT.

FEATURE ADJUSTMENT #1 appears with the adjustment name flashing. With the adjustment name flashing press [<] [>] to move between adjustments. Feature adjustments are changed similarly to standard adjustments using the SELECT button to choose options and the [<] [>] buttons to cycle through available settings.

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1.3 GAME PRICING REFERENCE TABLE

Country	ID	Pricing (Credits / Cost)						Unit per Pulse	Coin Door Pulse Settings					
									Left	Center	Right	4th	5th	6th
Australia	1	1/$1.00 AU	3/$2.00 AU					$0.10 AU	2	10	20	50	5	0
	2	1/$1.00 AU												
	3	1/$2.00 AU												
	4	1/$2.00 AU	2/$4.00 AU	3/$5.00 AU										
	5	1/$2.00 AU	2/$3.00 AU											
Canada	1	1/$0.50 CN	2/$0.75 CN	3/$1.00 CN				$0.25 CN	1	1	4	8	0	0
	2	1/$1.00 CN	3/$2.00 CN					$1.00 CN	1	1	2	2	0	0
China	1	1/5 Yaun	3/10 Yuan					1 Yuan	1	1	1	0	0	0
	2	1/10 Yaun	2/15 Yuan											
Croatia		1/3 kuna	2/5 kuna					1 kuna	1	2	5	1	0	0
Denmark	1	1/3 DKr	2/5 DKr					1 DKr	1	5	10	20	0	0
	2	1/2 DKr	2/4 DKr	3/5 DKr	4/7 DKr	5/9 DKr	7/10 DKr							
	3	1/5 DKr												
	4	1/10 DKr												
	5	1/20 DKr												
	6	1/10 DKr	3/20 DKr											
Euro	1	1/EUR 0.50						Electronic EUR 0.10	5	10	20	2	0	0
	2	1/EUR 0.50	2/EUR 1.00	3/EUR 1.50	5/EUR 2.00									
	3	1/EUR 0.50	3/EUR 1.00											
	4	1/EUR 1.00	2/EUR 2.00	3/EUR 3.00	5/EUR 4.00									
	5	1/EUR 1.00	3/EUR 2.00											
	6	1/EUR 1.00	2/EUR 1.50	3/EUR 2.00										
	7	1/EUR 1.00	3/EUR 2.00	7/EUR 3.00				Mechanical EUR 0.10	5	1	5	1	0	0
	8	1/EUR 1.00	4/EUR 2.00											
	9	2/EUR 1.00	4/EUR 2.00	6/EUR 3.00	9/EUR 4.00									
	10	1/EUR 2.00	2/EUR 3.00	3/EUR 4.00										
	11	1/EUR 2.00	2/EUR 4.00	3/EUR 5.00										
	12	1/EUR 2.00	3/EUR 4.00	7/EUR 6.00										
Indonesia	1	1/20000 Rp	2/40000 Rp	3/50000 Rp	4/60000 Rp	5/80000 Rp	8/100000 Rp	10,000 Rp	0	0	0	0	0	1
	2	1/20000 Rp	2/40000 Rp	4/50000 Rp	5/60000 Rp	6/80000 Rp	10/100000 Rp							
	3	2/20000 Rp	4/40000 Rp	6/50000 Rp	8/60000 Rp	10/80000 Rp	13/100000 Rp							
Japan	1	1/YEN 100						Yen 100	1	1	1	1	0	0
	2	1/YEN 100	3/YEN 200											
	2	1/YEN 200												
Lithuania		1/2 LTL						1 LTL	1	2	5	0	0	0
Middle East		1/1 token						1 token	1	1	1	1	0	0
New Zealand	1	1/$1 NZ						$1 NZ	1	1	2	1	0	0
	2	1/$1 NZ	3/$2 NZ											
	3	1/$2 NZ	2/$3 NZ											
Norway	1	1/10 NKr						1 NKr	1	5	10	20	0	0
	2	1/10 NKr	3/20NKr											
	3	1/20 NKr												
	4	1/20 NKr	3/40 NKr											
	5	1/5 NKr												
Russia		1/5 RUB						1 RUB	10	5	1	1	0	0
South Africa	1	1/R2						R 0.50	1	2	4	10	0	0
	2	1/R3	2/R5											
Sweden	1	1/10 SKr	2/15 SKr	3/20 SKr				1 SKr	1	5	10	2	0	0
	2	1/5 SKr												
	3	1/10 SKr												
	4	1/20 SKr												
	5	1/10 SKr	3/20 SKr											
Switzerland	1	1/1 SwF	2/2 SwF	3/3 SwF	4/4 SwF	6/5 SwF		1 SwF	1	2	5	1	0	0
	2	1/2 SwF	2/4 SwF	3/5 SwF										
Taiwan		1/10 TWD						10 TWD	1	1	1	1	0	0
UK	1	1/2.00						10p	1	5	10	2	20	0
	2	1/1.00												
	3	1/50p	2/1.00	3/1.50	5/2.00									
	4	1/2.00	2/3.00	4/5.00										
	5	1/1.00	3/2.00											
USA	1	1/$0.25						$0.25	1	4	1	1	0	0
	2	1/$0.50	2/$0.75	3/$1.00										
	3	1/$0.50												
	5	1/$0.50	2/$1.00	3/$1.50	5/$2.00									
	7	1/$0.50	2/$1.00	4/$1.50	6/$2.00									
	8	1/$0.50	3/$1.00											
	9	1/$1.00												
	10	1/$0.75	2/$1.50	3/$2.00										
	11	1/$1.00	3/$2.00											
	12	1/$0.25	2/$0.50	3/$0.75	5/$1.00									
	13	1/$1.00	2/$2.00	3/$3.00	4/$4.00	7/$5.00								

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1.4 TRANSPORTING THE GAME

When transporting the game, such as in the back of a truck or with a hand truck, the game's backbox must be secured to prevent damage to the side rails.

CAUTION

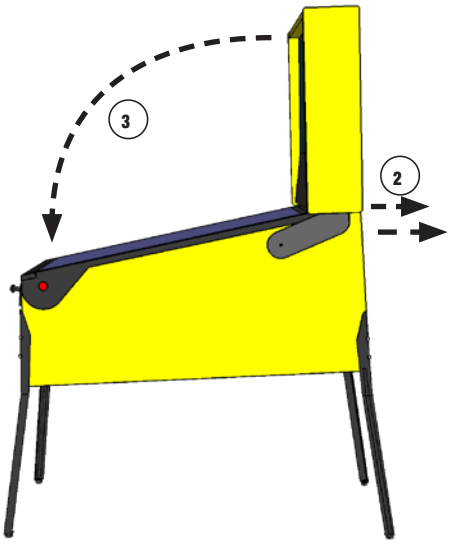
NEVER TRANSPORT THE GAME IN A MOVING VEHICLE WITH THE BACKBOX RAISED! TWO PEOPLE ARE REQUIRED TO REMOVE THE LEGS!

1. SECURE THE BACKBOX

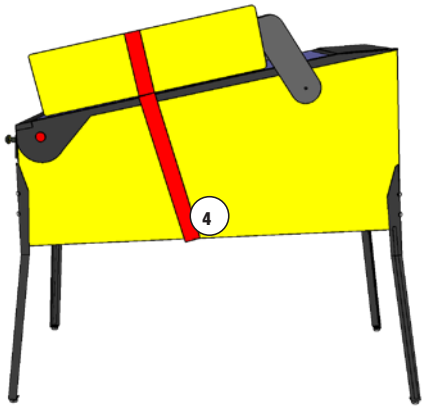
TOOLS REQUIRED

- **STRAP (500LB OR GREATER)**
- **AN ASSISTANT**
- **HAND TRUCK**

1. Ensure that the pinballs are removed from the playfield, and secure any free-moving mechanisms that may get damaged in transport

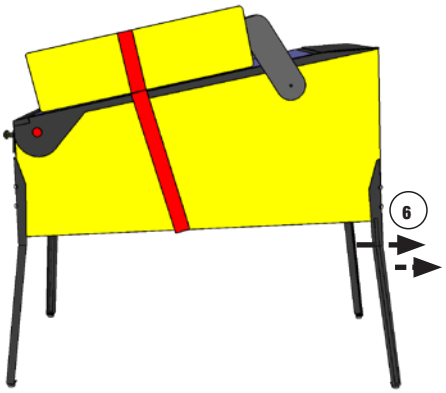


2. Remove the backbox securing bolts
3. Carefully lower the backbox onto the side rails. Use a piece of cardboard or suitable padding between the backbox and the game.

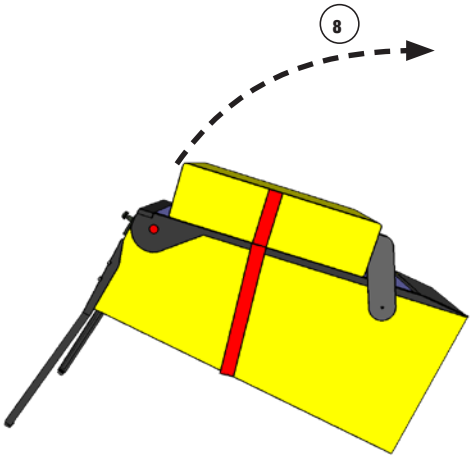


4. Securely strap the back box to the game
5. The game may be transported with the legs on. If the legs must be removed, follow the remaining steps.

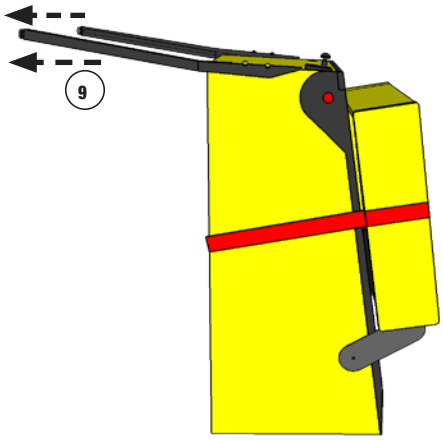
2. REMOVE THE LEGS AND STAND UP



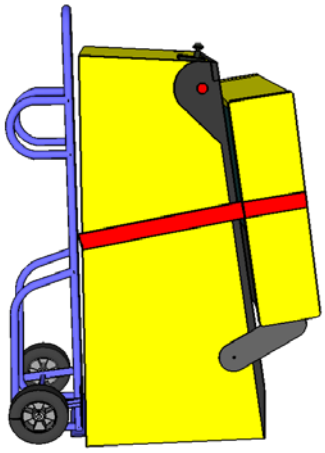
6. Remove the legs, rear legs first. Use a stool or a friend to support the rear of the game.
7. Rest the rear of the game on the ground.



8. Stand the game up on its back.



9. Remove the front two legs.



10. Secure all loose parts and transport with a hand truck in the upright position.

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1.5 MAINTENANCE

REGULAR MAINTENANCE - (MONTHLY/500 GAMES)

- Remove the playfield glass
- Enter the software diagnostics menu, start lamp test, then clean and wax the playfield.
  - While cleaning the playfield, identify and repair malfunctioning lights, loose parts, cracked plastics and worn rubber parts.
- While in diagnostics, enter the switch test (Select the "SW" Icon, then "TEST" Icon).
  - Use a pinball to actuate all switches and verify the correct switch registers with the switch test.
  - The game will play a sound to confirm the switch.
- Lift the playfield and inspect all assemblies for loose parts, broken wires or excessive wear. Look at the bottom of the cabinet for any parts that may have worked loose, then find the source.
- Check all coin door mechanisms and bill acceptor (if installed) for proper operation
- Play the game to ensure all coils and features are working
- Check the playfield to ensure it is level and set to the proper pitch using the bubble level on the right side wood rail.
- Check game audits: Replay % and Ball Time and note abnormal values which can indicate problems.
- Ensure game volume is set appropriately for the location.
- Clean both sides of the playfield glass and reinstall.
- Check and clean pinballs and replace if excessively worn or scuffed. Dirty pinballs accelerate game wear.

OVERHAUL MAINTENANCE - (5000 GAMES)

- Verify latest game software is installed
- Check flippers for excessive wear. Excessive flipper sloppiness (vertical or horizontal) or weakness indicates a flipper rebuild is required.
- Clean machine inside and out and check leg levelers for free operation.
- Visual check for loose or broken playfield and cabinet parts and repair as necessary.
- Electrical check: Plug into grounded outlet and check for proper operation through DIAGNOSTICS.
- Replace worn or dirty rubbers.
- Replace pinballs.
- Check all playfield switches with a pinball.
- Check all settings (refer to manual for factory settings).
- Check coin door: With door closed, insert coins to verify proper operation.
- Check for proper adjustment of the plumb bob tilt.
- Play game: Check for satisfactory operation.

COMMON PINBALL TOOLS

- Common nut drivers (1/4”, 5/16”, 11/32", 3/8”)
- Phillips screwdriver
- Standard Allen wrench/Hex key set
- 5/8” Socket with ratchet
- Adjustable wrench (5/8" & 9/16")
- 6" Torpedo Level (or use a pinball
- Flashlight or headlamp
- Soldering Iron (60w with flat tip), lead-free solder
- Wire cutter
- Wire stripper
- Long nose (“needle nose”) pliers

1.6 MAINTENANCE KITS

Description	Part Number
Dungeons & Dragons LE / Premium Playfield Plastics Kit	803-5000-X8
Dungeons & Dragons LE / Premium Playfield Decals Kit	802-5000-X8
Dungeons & Dragons LE Backbox Decal Left	820-90X8-01
Dungeons & Dragons Premium Backbox Decal Left	820-76X9-01
Dungeons & Dragons LE Backbox Decal Right	820-90X8-02
Dungeons & Dragons Premium Backbox Decal Right	820-76X9-02
Dungeons & Dragons LE Cabinet Decal Left	820-90X8-03
Dungeons & Dragons Premium Cabinet Decal Left	820-76X9-03
Dungeons & Dragons LE Cabinet Decal Right	820-90X8-04
Dungeons & Dragons Premium Cabinet Decal Right	820-76X9-04
Dungeons & Dragons LE Cabinet Decal Front	820-90X8-05
Dungeons & Dragons Premium Cabinet Decal Front	820-76X9-05
Dungeons & Dragons LE Playfield, Bare	830-5100-X8
Dungeons & Dragons Premium Playfield, Bare	830-5100-X9
Dungeons & Dragons LE Mirror Backglass	830-8426-X8
Dungeons & Dragons Premium Translite Backglass	830-8427-X9

1.7 COMMON PARTS

Description	Part Number
8 oz Pinball Playfield wax (Novus # 2)	675-0003-01
Standard Pinball, 1-1/16 in	260-5000-00
Flipper Rebuild Kit Left (Standard)	500-6307-10
Flipper Base Plate Kit Left	515-6617-01
Flipper Rebuild Kit Right	500-6307-00
Flipper Base Plate Kit Right	515-6617-00
Memory Card - SD 16GB	970-0140-16
Memory Card - MicroSD	970-0141-32
Wi-Fi Adapter	509-2023-02

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2. SPIKE SYSTEM AND NODE GUIDE

2.1 SPIKE SYSTEM OVERVIEW

The SPIKE Pinball system is a rugged, distributed, and embedded platform custom-designed for the rigors of the pinball machine environment. SPIKE takes advantage of modern technologies to deliver an immersive pinball experience that supports modern features, reduces cabling, and increases serviceability and reliability.

A Stern Pinball machine based on the SPIKE system will have at least two nodes networked together with the SPIKE node bus, a custom industrial pinball control bus that is designed around industry standards and optimized for the pinball environment. The primary CPU node is networked to one or more input/output nodes over standard Category 5 UTP (unshielded twisted pair) ethernet cabling.

There are five primary types of nodes that are found in the game.

- CPU node (Node 0) - The primary node that controls other nodes in the system. Contains the primary game software for the system and provides SPIKE node bus power for other nodes.
- Cabinet 48V node (Node 1) - Specialized node with specific inputs and outputs for coin doors, tilt mechanisms, and other bottom-cabinet devices.
- 48V playfield node - Controls high power devices such as coils and flashers, and also supports a few switch and low-power outputs. Powered by the system 48V power supply.
- Light and switch node - High-density switch and low-power LED outputs, bus-powered from the node bus. These boards contain as many 32 switch inputs and light outputs.
- Node extensions - These sub-nodes add additional low-power input and outputs to a specific Power or I/O node and are connected with simple serial bus.

2.2 NODE BUS CABLING

The SPIKE node bus utilizes standard Ethernet-style RJ45 8-pin modular jacks, and off-the-shelf Category 5e or better ethernet cabling. The node bus is electrically different from Ethernet and does not utilize Ethernet or TCP/IP protocols or signaling standards. SPIKE nodes are not compatible with standard computer networking equipment.

CAUTION: Plugging a SPIKE Node or CPU board into a standard Ethernet port may damage one or both devices and may void your warranty.

2.3 SYSTEM POWER

The SPIKE System is powered from an 48V DC power supply bus. Each SPIKE node converts this voltage to lower voltages required by the node and its specific components. A SPIKE 48V node typically controls high-power outputs such as game coil mechanisms and high-brightness LEDs. These powered nodes are supplied directly with 48V system power. SPIKE standard I/O nodes are low-power nodes that read switch inputs and output to standard-brightness LEDs. Standard I/O nodes use the node bus power, which is supplied by the main CPU node over the node bus modular jack connectors.

2.4 SPIKE NODE ADDRESSES

Each SPIKE node has a unique address ranging from 0 to 15. Not all addresses are used in all games. Nodes can be of the same part number, so the address is specified on the DIP switches on each node. When replacing a node, be certain that the correct address is set. Nodes can have 3-position and 4-position DIP switches. Refer to the appropriate table to set the address for each type of Node. The correct address for a node can be found in the SPIKE node reference section of the manual or in the game diagnostic software. Address 0 is reserved for the backbox CPU node, where the game software resides. Address 1 is reserved for the cabinet node, located inside the coin door. These two nodes do not have DIP switches as their address is not configurable.

Address	1	2	3
8	OFF	OFF	OFF
9	OFF	OFF	ON
10	OFF	ON	OFF
11	OFF	ON	ON
12	ON	OFF	OFF
13	ON	OFF	ON
14	ON	ON	OFF
15	ON	ON	ON

SPIKE node addresses for nodes with 3-position DIP switches. Addresses 0-7 are not used by SPIKE nodes with 3-position DIP switches.

Address	1	2	3	4
8	OFF	OFF	OFF	OFF
9	OFF	OFF	ON	OFF
10	OFF	ON	OFF	OFF
11	OFF	ON	ON	OFF
12	ON	OFF	OFF	OFF
13	ON	OFF	ON	OFF
14	ON	ON	OFF	OFF
15	ON	ON	ON	OFF

SPIKE node addresses for nodes with 4-position DIP switches. Addresses 0-7 are reserved for fixed-function nodes and do not require configuration.

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SPIKE SYSTEM AND NODE GUIDE CONTINUED

2.5 SPIKE NODE PROGRAMMING

The SPIKE nodes are smart nodes that have on-board processors and run embedded code. The nodes are programmed automatically by the CPU node whenever software updates are installed to the CPU. When replacing a node, the CPU node will detect and update the node to the latest software with no user intervention. Always replace nodes with the power to the game turned OFF.

2.6 SPIKE SYSTEM TERMINOLOGY

MULTI GENERAL ILLUMINATION LIGHTING

General Illumination Lighting is two or more lights powered by one control source. These are often a number of LEDs connected in parallel and the system controls these as one large LED. A missing LED will not affect these circuits, however a shorted LED can cause the entire string of LEDs to turn off.

SINGLE LIGHTS

Single lights and LEDs are direct-controlled from SPIKE node boards. A common power source is grounded by individual transistors to turn individual LEDs on and off. Groups of LEDs, usually by node connector, share a common power source, so if a group of LEDs is out, check the wiring for the power source.

FLASHERS

SPIKE games treat flashers the same as single LEDs that draw more power. Flashers are controlled from the same circuits that power regular lights.

DRIVERS

A driver is a circuit that controls a high power-device such as a coil, magnet, or motor. Each device has a common 48V power source that is then connected to ground by a dedicated control transistor. Each driver is protected against shorting, static electricity, and over-current conditions. Take caution as 48V is always present on a device even when it is not energized.

OPTOS

Certain types of optical switches (“optos”) require external signal conditioning. For these optos, they will interface to a SPIKE node via an opto signal conditioning board. Other optical switches connect directly to the Spike node board.

CAUTION: Unless explicitly directed by an Authorized Stern Repair technician, perform ALL work on your pinball machine with the power disabled!

INPUT/OUTPUT PROTECTIONS

SPIKE features built-in short-circuit, static electricity, and other protections to maximize reliability. If an LED, coil or other device shorts, it will be disabled but will not shut down the entire system in most circumstances. Groups of LEDs, coils, and switches often share common power supplies or other circuits, so it is possible that a bad device will affect the group of related devices and require removal or repair to fix the group. The system diagnostics will inform the technician of shorted or otherwise malfunctioning devices whenever possible. While the system is protected against permanent damage, it is strongly recommended to repair or replace these bad components as soon as possible to minimize downtime and maximize game earnings.

2.7 COMMON SPIKE NODE BOARDS

Description	Type	Part Number
SPIKE CPU Node	Node	509-1003-01
Cabinet Node	Node	520-6967-72
Playfield 48V Core-Driver Node	Node	520-1057-00 520-1070-00
Trough Serial Opto Receiver Extension	Extension	520-8516-00
QR Scanner Assembly	Assembly	509-2020-00

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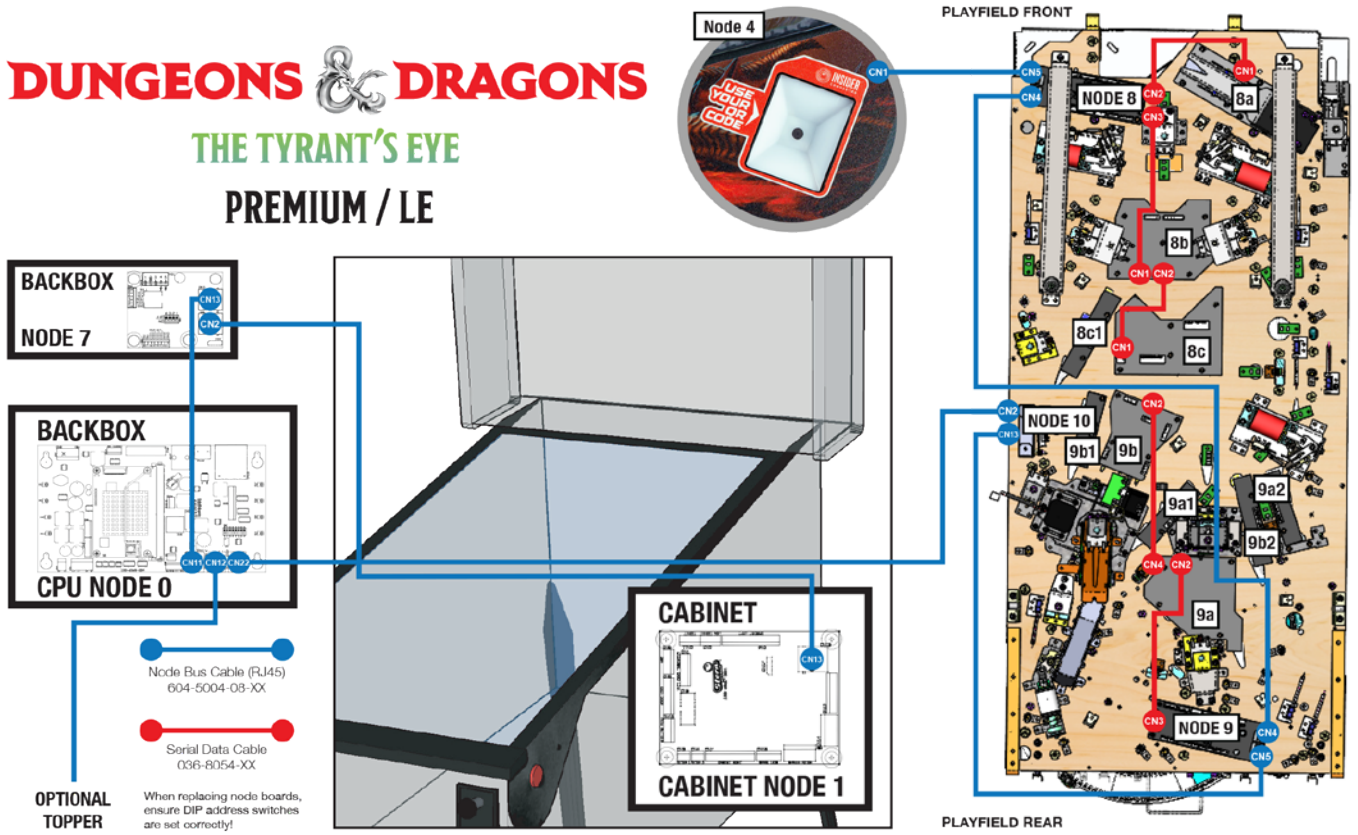
3. LIGHT, SWITCH, AND DRIVER REFERENCE



3.1 SPIKE NODE BOARDS

ID	DIP Address	Description	Location	Part Number
Node 0	n/a	SPIKE 2 CPU Node	Backbox	509-1003-01
Node 1	n/a	Cabinet Node	Cabinet	520-6967-72
Node 4	n/a	QR Reader Node	Bottom Arch	509-2020-00
Node 7	OFF-OFF-OFF-ON	SPI Node Board (LE Option)	Backbox LEDs	520-5370-72
Node 8	OFF-OFF-OFF-OFF	Core - Driver Node	Lower Playfield	520-1070-00 520-1057-00
8a	n/a	Trough Serial Opto Receiver Extension	Playfield	520-8516-00
8b	n/a	13R MB ROPE 6S LED Board	Playfield	520-8680-00
8c	n/a	6 Wht - 6 Red Center Mid LED Board	Playfield	520-8646-00
8c1	n/a	2 Wht - 2 Red Bottom Left LED Board	Playfield	520-8650-00
Node 9	OFF-OFF-ON-OFF	Core - Driver Node	Playfield	520-1070-00 520-1057-00
9a	n/a	3 Wht - 6 Red Top Center LED Board	Playfield	520-8644-00
9a1	n/a	1 Wht - 2 Red Top Center LED Board	Playfield	520-8649-00
9a2	n/a	1 Wht - 2 Red Top Center LED Board	Playfield	520-8649-00
9b	n/a	9 Wht - CM ROPE 5S LED Board	Playfield	520-8681-00
9b1	n/a	2 Wht - 2 Red Bottom Left LED Board	Playfield	520-8682-00
9b2	n/a	2 Wht - 2 Red Bottom Left LED Board	Playfield	520-8650-00
Node 10	OFF-ON-OFF-OFF	Stepper Motor Node Board	Playfield	520-5379-22
Node 12	ON-OFF-OFF-OFF	Topper (Optional)	Topper	

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3.2 DRIVER REFERENCE

ID	Name	Node	Connector	Ret. Pin	Ret. Wire	Voltage	V+ Pin	V+ Color	Location	Type	Address	Part Number
1	Trough	8	CN8	7	ORG GRY	48V	1-4	GRY ORG	Playfield	Coil - 27-1500	8-DR-1	090-5004-ND
2	Auto Plunger	8	CN8	9	ORG WHT	48V	1-4	GRY ORG	Playfield	Coil - 23-800	8-DR-4	090-5001-ND
3	Left Flipper	8	CN8	6	ORG YEL	48V	1-4	GRY ORG	Playfield	Coil - 22-1080	8-DR-5	090-5032-ND
4	Right Flipper	8	CN8	5	ORG GRN	48V	1-4	GRY ORG	Playfield	Coil - 22-1080	8-DR-0	090-5032-ND
5	Left Slingshot	8	CN8	11	ORG BLU	48V	1-4	GRY ORG	Playfield	Coil - 26-1200	8-DR-3	090-5044-ND
6	Right Slingshot	8	CN8	10	ORG VIO	48V	1-4	GRY ORG	Playfield	Coil - 26-1200	8-DR-2	090-5044-ND
7	Shaker Motor	1	CN16	1	BLU	48V	5	RED	Cabinet	Motor	1-DR-0	041-5029-04
8	Shield	8	CN7	3	YEL BLK	48V	1	GRY ORG	Playfield	Coil - 26-1200	8-DR-6	090-5044-ND
9	Up Right Flipper	8	CN7	4	YEL BRN	48V	1	GRY ORG	Playfield	Coil - 22-1080	8-DR-7	090-5032-ND
10	Left Eject	8	CN7	2	YEL RED	48V	1	GRY ORG	Playfield	Coil - 26-1200	8-DR-8	090-5044-ND
11	Up Post	9	CN7	3	ORG BLK	48V	1	GRY BRN	Playfield	Coil - 26-1200	9-DR-6	090-5044-ND
12	Dragon VUK	9	CN8	11	ORG BRN	48V	1-4	GRY BRN	Playfield	Coil - 23-800	9-DR-3	090-5001-ND
13	Diverter	9	CN8	5	YEL GRY	48V	1-4	GRY BRN	Playfield	Coil - 26-1200	9-DR-0	090-5044-ND
14	Up/Down Ramp	9	CN8	6	YEL VIO	48V	1-4	GRY BRN	Playfield	Coil - 22-1080	9-DR-5	090-5032-ND
15	Magnet	9	CN8	10	BRN RED	48V	1-4	GRY BRN	Playfield	Coil - 22-650	9-DR-2	511-5065-ND
16	Dungeon	9	CN7	4	YEL BLU	48V	1	GRY BRN	Playfield	Coil - 22-1080	9-DR-7	090-5032-ND
17												
18	Top VUK	9	CN7	2	YEL ORG	48V	1	GRY BRN	Playfield	Coil - 23-800	9-DR-8	090-5001-ND
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33	Coin Meter	1	CN3	2	BLK	12V	1	RED	Cabinet	Digital Out	1-DR-2	500-9946-00
34	Ticket Meter	1	CN4	2	BLK	12V	1	RED	Cabinet	Digital Out	1-DR-3	500-9946-00
35	Ticket Dispenser	1	CN11	3		12V	1		Cabinet	Digital Out	1-DR-4	

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DRIVER REFERENCE CONTINUED

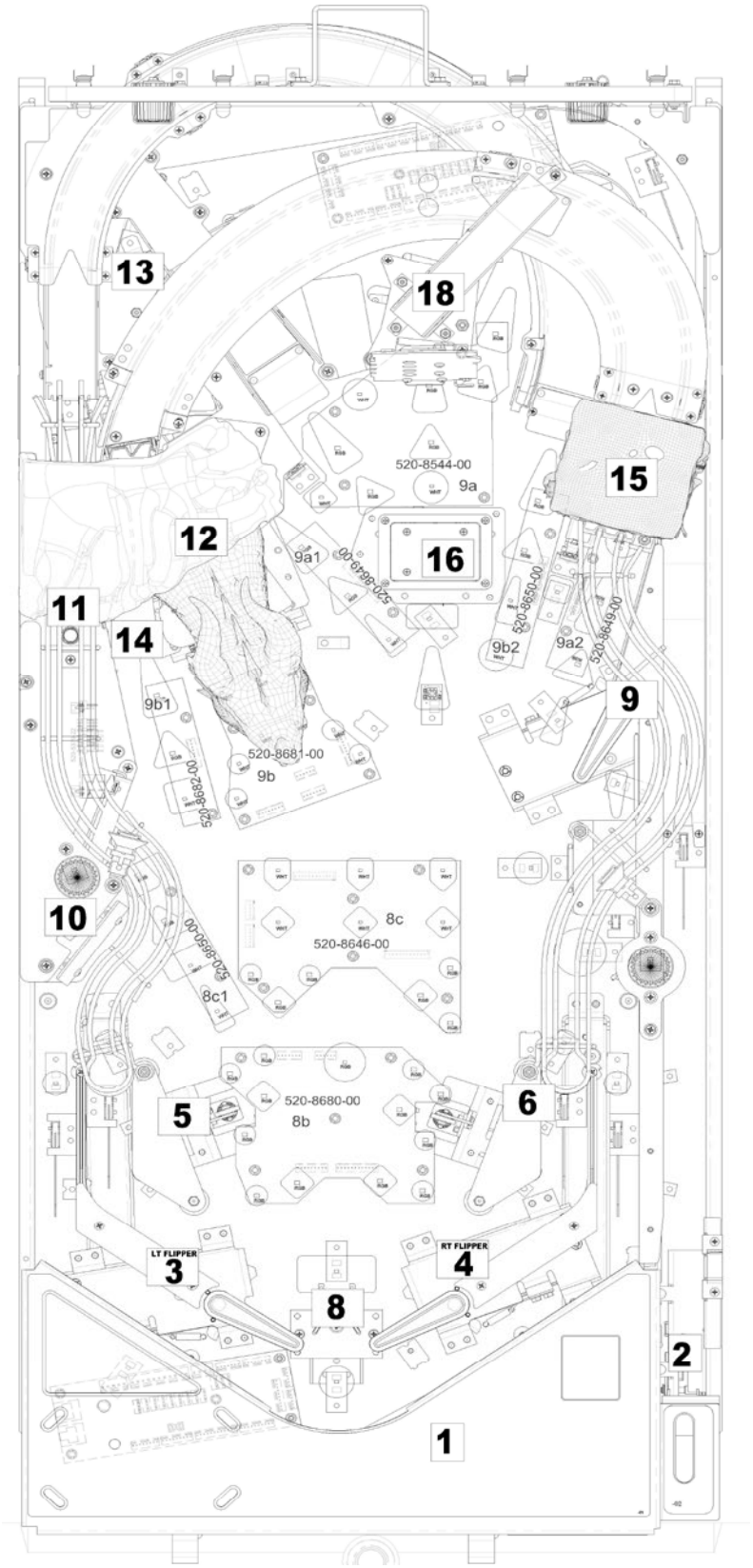

Figure 3.2.1. Playfield driver locations (top view).

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3.3 SWITCH REFERENCE

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
1	Left Outlane	8	-	CN11	4	LGN RED	11/12	BLK ORG	Playfield	Rollover	8-SW-17	500-9935-04
2	Left Return Lane	8	-	CN11	5	LGN ORG	11/12	BLK ORG	Playfield	Rollover	8-SW-18	500-9935-03
3												
4												
5	Right Return Lane	8	-	CN11	6	LGN YEL	11/12	BLK ORG	Playfield	Rollover	8-SW-19	500-9935-04
6	Right Outlane	8	-	CN11	7	LGN BLU	11/12	BLK ORG	Playfield	Rollover	8-SW-20	500-9935-04
7	Left Slingshot	8	-	CN10	4	GRY BLU	8	BLK GRN	Playfield	Leaf	8-SW-30	180-5231-00
8	Right Slingshot	8	-	CN10	3	GRY VIO	8	BLK GRN	Playfield	Leaf	8-SW-29	180-5231-00
9	Left Flipper Button	8	-	CN9	4	GRY BRN	7	BLK GRN	Cabinet	Leaf	8-SW-25	180-5160-01
10	Right Flipper Button	8	-	CN9	3	GRY RED	7	BLK GRN	Cabinet	Leaf	8-SW-24	180-5164-01
11	Left Flipper EOS	8	-	CN10	6	GRY YEL	9	BLK GRN	Playfield	Leaf	8-SW-16	180-5149-00
12	Right Flipper EOS	8	-	CN10	5	GRY GRN	9	BLK GRN	Playfield	Leaf	8-SW-31	180-5149-00
13	Shooter Lane-Upper	8	-	CN11	3	LGN BRN	11/12	BLK ORG	Playfield	Rollover	8-SW-27	500-9935-04
14	Up Right Flipper Button	8	-	CN9	5	VIO WHT	7	BLK VIO	Playfield	Leaf	8-SW-26	180-5164-01
15	Trough 6	8	8a	CN14	-		-		Playfield	Opto	8-SW-32	520-5344-00 tx 520-8516-00 rx
16	Trough 5	8	8a	CN14	-		-		Playfield	Opto	8-SW-33	520-5344-00 tx 520-8516-00 rx
17	Trough 4	8	8a	CN14	-		-		Playfield	Opto	8-SW-34	520-5344-00 tx 520-8516-00 rx
18	Trough 3	8	8a	CN14	-		-		Playfield	Opto	8-SW-35	520-5344-00 tx 520-8516-00 rx
19	Trough 2	8	8a	CN14	-		-		Playfield	Opto	8-SW-36	520-5344-00 tx 520-8516-00 rx
20	Trough 1	8	8a	CN14	-		-		Playfield	Opto	8-SW-37	520-5344-00 tx 520-8516-00 rx
21	Trough Jam	8	8a	CN14	-		-		Playfield	Opto	8-SW-38	520-5344-00 tx 520-8516-00 rx
22	Shooter Lane	8	-	CN10	2	GRY WHT	7	BLK GRN	Playfield	Micro	8-SW-28	180-5157-01
23												
24	Up Right Flipper EOS	8	-	CN12	9	PNK BRN	10	BLK RED	Playfield	Leaf	8-SW-15	180-5149-00
25												
26												
27												
28												
29												
30	Hidden Passage	8	-	CN11	8	LGN VIO	11/12	BLK ORG	Playfield	Rollover	8-SW-21	500-9935-03
31	Secret Door Target	8	-	CN11	9	LGN GRY	11/12	BLK ORG	Playfield	Leaf, Target	8-SW-22	515-9784-00-00
32												
33												
34												
35												
36												
37	Left Eject	8	-	CN12	7	WHT BLU	10	BLK RED	Playfield	Micro	8-SW-13	180-5209-00
38												
39												
40	Dragon Target Left	8	-	CN12	4	WHT ORG	10	BLK RED	Playfield	Leaf, Target	8-SW-10	515-9783-00-01
41	Dragon Target Center	8	-	CN12	5	WHT YEL	10	BLK RED	Playfield	Leaf, Target	8-SW-11	515-9783-00-01
42	Dragon Target Right	8	-	CN12	6	WHT GRN	10	BLK RED	Playfield	Leaf, Target	8-SW-12	515-9783-00-01
43												
44	Dragon Hold 1	9	-	CN10	2	GRY BLK	7/8/9	BLK BLU	Playfield	Opto	9-SW-28	520-8658-00 tx 520-8659-00 rx

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SWITCH REFERENCE CONTINUED

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
45	Dragon Hold 2	9	-	CN10	3	GRY BRN	7/8/9	BLK BLU	Playfield	Opto	9-SW-29	520-8658-00 tx 520-8659-00 rx
46	Dragon Hold 3	9	-	CN10	4	GRY RED	7/8/9	BLK BLU	Playfield	Opto	9-SW-30	520-8658-00 tx 520-8659-00 rx
47	Dragon Hold 4	9	-	CN10	5	GRY ORG	7/8/9	BLK BLU	Playfield	Opto	9-SW-31	520-8658-00 tx 520-8659-00 rx
48	Dragon Hold Stack	9	-	CN10	6	GRY YEL	7/8/9	BLK BLU	Playfield	Opto	9-SW-16	520-8658-00 tx 520-8659-00 rx
49												
50	Dragon LR Away	10	-	CN5	3	WHT GRY	7/8	BLK	Playfield	Opto	10-SW-0	520-7021-01
51	Dragon LR Home	10	-	CN5	4	WHT	7/8	BLK	Playfield	Opto	10-SW-1	520-7021-01
52	Dragon UD Home	10	-	CN5	5	WHT VIO	7/8	BLK	Playfield	Opto	10-SW-2	520-5357-00
53												
54												
55												
56	Dungeon Opto-Upper	9	-	CN11	4	TAN ORG	11/12	BLK GRY	Playfield	Opto	9-SW-17	520-8675-00 tx 520-8676-00 rx
57	Dungeon Opto-Lower	9	-	CN11	5	TAN YEL	11/12	BLK GRY	Playfield	Opto	9-SW-18	520-8675-00 tx 520-8676-00 rx
58	Cube Enter Opto	9	-	CN11	6	TAN GRN	11/12	BLK GRY	Playfield	Opto	9-SW-19	515-0215-00 tx 515-0215-01 rx
59	Bottom Right Orbit Opto	9	-	CN11	7	TAN BLU	11/12	BLK GRY	Playfield	Opto	9-SW-20	515-0215-00 tx 511-5815-01 rx (520-8116-00)
60	Center Ramp Opto	9	-	CN11	8	TAN VIO	11/12	BLK GRY	Playfield	Opto	9-SW-21	515-0215-00 tx 515-0215-01 rx
61	Right Ramp Opto	9	-	CN11	9	TAN WHT	11/12	BLK GRY	Playfield	Opto	9-SW-22	515-0215-00 tx 515-0215-01 rx
62	Left Ramp Opto	9	-	CN11	10	TAN	11/12	BLK GRY	Playfield	Opto	9-SW-23	515-0215-00 tx 515-0215-01 rx
63												
64												
65	Dungeon Left Target	9	-	CN12	2	WHT BRN	10	BLK WHT	Playfield	Leaf, Target	9-SW-8	515-9785-00-00
66	Dungeon Right Target	9	-	CN12	3	WHT RED	10	BLK WHT	Playfield	Leaf, Target	9-SW-9	515-9785-00-00
67												
68	Critical Hit Target	9	-	CN12	5	WHT YEL	10	BLK WHT	Playfield	Leaf, Target	9-SW-11	515-9783-00-00
69												
70	Spinner Opto	9	-	CN12	7	WHT BLU	10	BLK WHT	Playfield	Opto	9-SW-13	520-8541-00
71	Top VUK	9	-	CN12	8	WHT VIO	10	BLK WHT	Playfield	Micro	9-SW-14	180-5209-00
72	Dragon Jaw	9	-	CN12	9	WHT GRY	10	BLK WHT	Playfield	Leaf	9-SW-15	180-5227-02
73												
74												
75												
76												
77	Left Orbit	9	-	CN13	2	PNK RED	10	BLK BRN	Playfield	Rollover	9-SW-0	500-9935-04
78	Left Loop	9	-	CN13	3	PNK ORG	10	BLK BRN	Playfield	Gate	9-SW-1	180-5087-00
79	Right Loop	9	-	CN13	4	PNK YEL	10	BLK BRN	Playfield	Rollover	9-SW-2	500-9935-03
80	Top Right Orbit	9	-	CN13	5	PNK GRN	10	BLK BRN	Playfield	Rollover	9-SW-3	500-9935-03
81												
82												
83												
84												
85												

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SWITCH REFERENCE CONTINUED

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
86												
87												
88												
89												
90	Lockdown Button	1	-	CN7	8	TAN WHT	5	BLK WHT	Cabinet	Leaf	1-SW-2	180-5218-00
91												
92												
93	Start Button	1	-	CN6	10	GRY	5	BLK WHT	Cabinet	Micro	1-SW-11	500-1060-44-LED
94	Tournament Start Button	1	-	CN6	9	GRY WHT	5	BLK WHT	Cabinet	Micro	1-SW-12	500-6587-06-TL
95												
96	Left Coin	1	-	CN5	9	PNK BRN	3	BLK	Cabinet	Micro	1-SW-16	
97	Right Coin	1	-	CN5	7	PNK ORG	3	BLK	Cabinet	Micro	1-SW-18	
98	Center Coin	1	-	CN5	8	PNK RED	3	BLK	Cabinet	Micro	1-SW-17	
99	Fourth Coin	1	-	CN5	6		-		Cabinet	-	1-SW-19	
100	Fifth Coin	1	-	CN5	5		-		Cabinet	-	1-SW-20	
101	Tilt Pendulum	1	-	CN6	7	WHT	5	BLK WHT	Cabinet	Plumb Bob	1-SW-14	516-0007-00
102	Sixth Coin	1	-	CN9	5		-		Cabinet	-	1-SW-21	
103	Ticket Notch	1	-	CN11	5		-		Cabinet	-	1-SW-8	
104	Slam Tilt	1	-	CN5	4	LGN RED	3	BLK	Cabinet	-	1-SW-22	
105												
106												
107												
108												
109												
110												
C1	DIP 1	0	-	-	-		-		CPU Node		0-SW-0	-
C2	DIP 2	0	-	-	-		-		CPU Node		0-SW-1	-
C3	DIP 3	0	-	-	-		-		CPU Node		0-SW-2	-
C4	DIP 4	0	-	-	-		-		CPU Node		0-SW-3	-
C5	DIP 5	0	-	-	-		-		CPU Node		0-SW-4	-
C6	DIP 6	0	-	-	-		-		CPU Node		0-SW-5	-
C7	DIP 7	0	-	-	-		-		CPU Node		0-SW-6	-
C8	DIP 8	0	-	-	-		-		CPU Node		0-SW-7	-
C9	Service Select	0	-	CN25	4	LGN GRY	6	BLK	Coin Door		0-SW-8	515-1963-00
C10	Service Plus	0	-	CN25	3	LGN VIO	6	BLK	Coin Door		0-SW-9	515-1963-00
C11	Service Minus	0	-	CN25	2	LGN BLU	6	BLK	Coin Door		0-SW-10	515-1963-00
C12	Service Back	0	-	CN25	1	LGN BLK	6	BLK	Coin Door		0-SW-11	515-1963-00
C17	Headphone Detect	0	-	-	-	-	-	-	Coin Door		0-SW-16	-
C18	Headphone Kit Cable Detect	0	-	CN3	5	BLK	4	BLK	CPU Node		0-SW-17	-
C19	Volume Encoder 1	0	-	CN3	6	WHT	1	DRAIN	CPU Node		0-SW-18	-
C20	Volume Encoder 2	0	-	CN3	7	GRN	1	DRAIN	CPU Node		0-SW-19	-
C24	Coin Door Interlock	0	-	CN4	1	GRY	4	GRY RED	Backbox		0-SW-23	-

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SWITCH REFERENCE CONTINUED

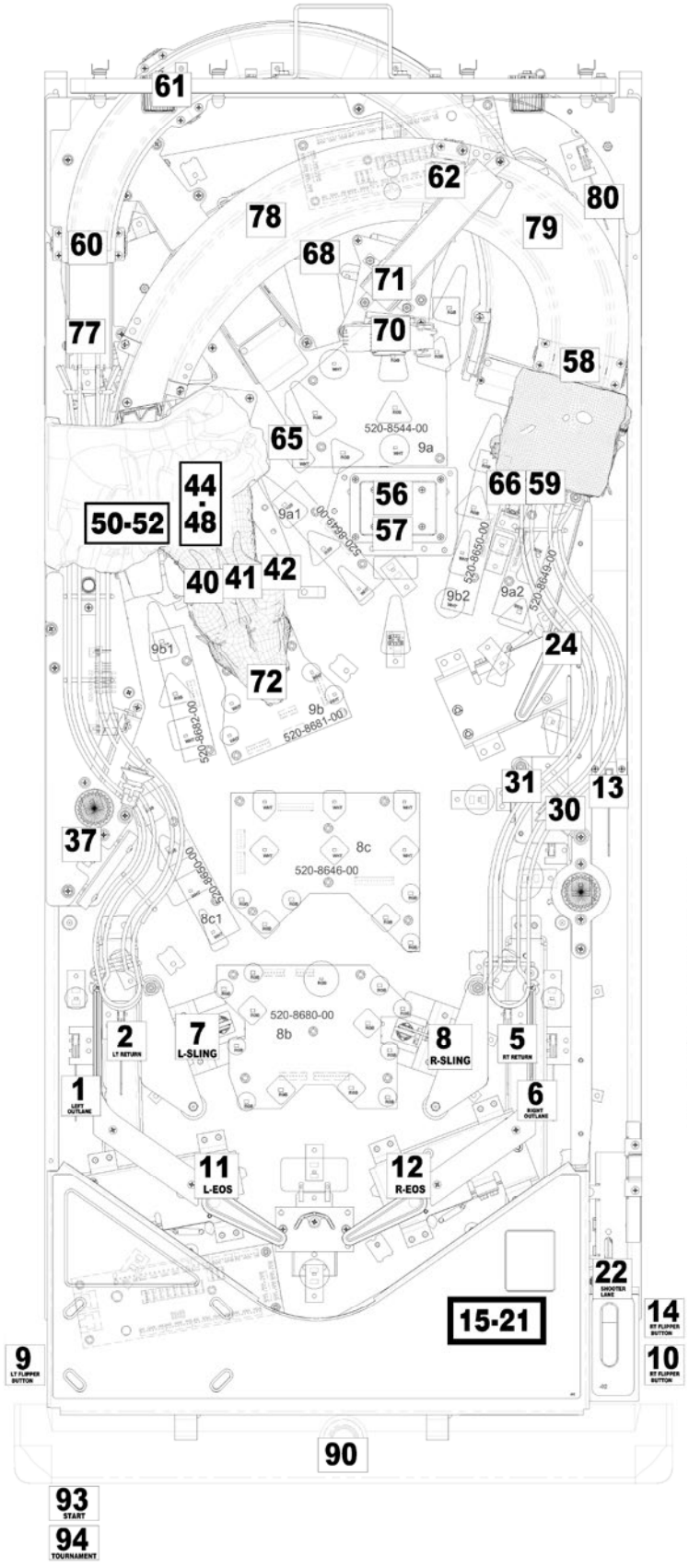

Figure 3.3.1. Playfield switch locations (top view).

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3.4 LIGHT REFERENCE

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
1	Coin Enable	1	-	CN8	6	BLK GRY	2	GRY RED	Coin Door	Digital Out		1-LP-0	
2	Start Button	1	-	CN6	3	YEL BRN	1	RED	Cabinet	Feature	White	1-LP-2	113-5071-00
3	Tournament Start	1	-	CN6	2	YEL RED	1	RED	Cabinet	Feature	White	1-LP-3	112-5031-01
4	Lockdown Button-R	1	-	CN7	2	RED WHT	1	RED	Cabinet	Feature	RGB	1-LP-5	520-5333-00
5	Lockdown Button-G	1	-	CN7	3	GRN WHT	1	RED	Cabinet	Feature	RGB	1-LP-4	520-5333-00
6	Lockdown Button-B	1	-	CN7	4	BLU WHT	1	RED	Cabinet	Feature	RGB	1-LP-7	520-5333-00
7													
8													
9													
10													
11	Left Outlane	8	b	CN3	6	BRN RED	1-5	RED	Playfield	Feature	White	8-LP-47	520-5307-00
12	Left Return Lane	8	b	CN3	7	BRN ORG	1-5	RED	Playfield	Feature	White	8-LP-48	520-5307-00
13	Right Return Lane	8	b	CN4	6	BRN YEL	1-5	RED	Playfield	Feature	White	8-LP-51	520-5307-00
14	Right Outlane	8	b	CN4	7	BRN BLU	1-5	RED	Playfield	Feature	White	8-LP-52	520-5307-00
15													
16	Shield	8	b	CN3	8	BRN GRN	1-5	RED	Playfield	Feature	White	8-LP-49	520-5307-00
17	Shoot again	8	b	CN4	6	BRN VIO	1-5	RED	Playfield	Feature	White	8-LP-50	520-5307-00
18													
19													
20													
21													
22	White 1-R	8	b	LED2	-	-	-	-	Playfield	Feature	RGB	8-LP-11	520-8680-00
23	White 1-G	8	b	LED2	-	-	-	-	Playfield	Feature	RGB	8-LP-12	520-8680-00
24	White 1-B	8	b	LED2	-	-	-	-	Playfield	Feature	RGB	8-LP-13	520-8680-00
25	Orange 2-R	8	b	LED1	-	-	-	-	Playfield	Feature	RGB	8-LP-8	520-8680-00
26	Orange 2-G	8	b	LED1	-	-	-	-	Playfield	Feature	RGB	8-LP-9	520-8680-00
27	Orange 2-B	8	b	LED1	-	-	-	-	Playfield	Feature	RGB	8-LP-10	520-8680-00
28	Greenest-R	8	b	LED13	-	-	-	-	Playfield	Feature	RGB	8-LP-44	520-8680-00
29	Greenest-G	8	b	LED13	-	-	-	-	Playfield	Feature	RGB	8-LP-45	520-8680-00
30	Greenest-B	8	b	LED13	-	-	-	-	Playfield	Feature	RGB	8-LP-46	520-8680-00
31	Blue 2-R	8	b	LED12	-	-	-	-	Playfield	Feature	RGB	8-LP-41	520-8680-00
32	Blue 2-G	8	b	LED12	-	-	-	-	Playfield	Feature	RGB	8-LP-42	520-8680-00
33	Blue 2-B	8	b	LED12	-	-	-	-	Playfield	Feature	RGB	8-LP-43	520-8680-00
34	Blue 1-R	8	b	LED11	-	-	-	-	Playfield	Feature	RGB	8-LP-38	520-8680-00
35	Blue 1-G	8	b	LED11	-	-	-	-	Playfield	Feature	RGB	8-LP-39	520-8680-00
36	Blue 1-B	8	b	LED11	-	-	-	-	Playfield	Feature	RGB	8-LP-40	520-8680-00
37	West Gate-R	8	b	LED10	-	-	-	-	Playfield	Feature	RGB	8-LP-35	520-8680-00
38	West Gate-G	8	b	LED10	-	-	-	-	Playfield	Feature	RGB	8-LP-36	520-8680-00
39	West Gate-B	8	b	LED10	-	-	-	-	Playfield	Feature	RGB	8-LP-37	520-8680-00
40	Dark Hold-R	8	b	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-14	520-8680-00
41	Dark Hold-G	8	b	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-15	520-8680-00
42	Dark Hold-B	8	b	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-16	520-8680-00
43	Orange 1-R	8	b	LED4	-	-	-	-	Playfield	Feature	White	8-LP-17	520-8680-00
44	Orange 1-G	8	b	LED4	-	-	-	-	Playfield	Feature	White	8-LP-18	520-8680-00
45	Orange 1-B	8	b	LED4	-	-	-	-	Playfield	Feature	White	8-LP-19	520-8680-00
46	White 2-R	8	b	LED5	-	-	-	-	Playfield	Feature	White	8-LP-20	520-8680-00
47	White 2-G	8	b	LED5	-	-	-	-	Playfield	Feature	White	8-LP-21	520-8680-00
48	White 2-B	8	b	LED5	-	-	-	-	Playfield	Feature	White	8-LP-22	520-8680-00
49	Kobold Mining Town-R	8	b	LED6	-	-	-	-	Playfield	Feature	White	8-LP-23	520-8680-00
50	Kobold Mining Town-G	8	b	LED6	-	-	-	-	Playfield	Feature	White	8-LP-24	520-8680-00
51	Kobold Mining Town-B	8	b	LED6	-	-	-	-	Playfield	Feature	White	8-LP-25	520-8680-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
52	Purple 2-R	8	b	LED7	-	-	-	-	Playfield	Feature	White	8-LP-26	520-8680-00
53	Purple 2-G	8	b	LED7	-	-	-	-	Playfield	Feature	White	8-LP-27	520-8680-00
54	Purple 2-B	8	b	LED7	-	-	-	-	Playfield	Feature	White	8-LP-28	520-8680-00
55	Arabel-R	8	b	LED9	-	-	-	-	Playfield	Feature	White	8-LP-32	520-8680-00
56	Arabel-G	8	b	LED9	-	-	-	-	Playfield	Feature	White	8-LP-33	520-8680-00
57	Arabel-B	8	b	LED9	-	-	-	-	Playfield	Feature	White	8-LP-34	520-8680-00
58	Purple 1-R	8	b	LED8	-	-	-	-	Playfield	Feature	White	8-LP-29	520-8680-00
59	Purple 1-G	8	b	LED8	-	-	-	-	Playfield	Feature	White	8-LP-30	520-8680-00
60	Purple 1-B	8	b	LED8	-	-	-	-	Playfield	Feature	White	8-LP-31	520-8680-00
61													
62	New Character 1	8	c	LED1	-	-	-	-	Playfield	Feature	White	8-LP-56	520-8646-00
63	New Character 2	8	c	LED5	-	-	-	-	Playfield	Feature	White	8-LP-64	520-8646-00
64	New Character 3	8	c	LED26	-	-	-	-	Playfield	Feature	White	8-LP-91	520-8646-00
65													
66	Ritual	8	c	LED2	-	-	-	-	Playfield	Feature	White	8-LP-57	520-8646-00
67	Undermountain	8	c	LED6	-	-	-	-	Playfield	Feature	White	8-LP-65	520-8646-00
68	Rescue King	8	c	LED28	-	-	-	-	Playfield	Feature	White	8-LP-95	520-8646-00
69	Blue 3-R	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-58	520-8646-00
70	Blue 3-G	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-59	520-8646-00
71	Blue 3-B	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-60	520-8646-00
72	Dragonspear Castle-R	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-61	520-8646-00
73	Dragonspear Castle-G	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-62	520-8646-00
74	Dragonspear Castle-B	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-63	520-8646-00
75	Orange 3-R	8	c	LED7	-	-	-	-	Playfield	Feature	RGB	8-LP-66	520-8646-00
76	Orange 3-G	8	c	LED7	-	-	-	-	Playfield	Feature	RGB	8-LP-67	520-8646-00
77	Orange 3-B	8	c	LED7	-	-	-	-	Playfield	Feature	RGB	8-LP-68	520-8646-00
78	White 3-R	8	c	LED16	-	-	-	-	Playfield	Feature	RGB	8-LP-77	520-8646-00
79	White 3-G	8	c	LED16	-	-	-	-	Playfield	Feature	RGB	8-LP-78	520-8646-00
80	White 3-B	8	c	LED16	-	-	-	-	Playfield	Feature	RGB	8-LP-79	520-8646-00
81	Gauntlgrym-R	8	c	LED27	-	-	-	-	Playfield	Feature	RGB	8-LP-92	520-8646-00
82	Gauntlgrym-G	8	c	LED27	-	-	-	-	Playfield	Feature	RGB	8-LP-93	520-8646-00
83	Gauntlgrym-B	8	c	LED27	-	-	-	-	Playfield	Feature	RGB	8-LP-94	520-8646-00
84	Purple 3-R	8	c	LED25	-	-	-	-	Playfield	Feature	RGB	8-LP-88	520-8646-00
85	Purple 3-G	8	c	LED25	-	-	-	-	Playfield	Feature	RGB	8-LP-89	520-8646-00
86	Purple 3-B	8	c	LED25	-	-	-	-	Playfield	Feature	RGB	8-LP-90	520-8646-00
87													
88	Secret Passage	8	c	CN4	5	YEL ORG	1-4	RED	Playfield	Feature	White	8-LP-80	520-5307-00
89	Secret Door	8	b	CN4	9	ORG BRN	1-5	RED	Playfield	Feature	White	8-LP-53	520-5307-00
90													
91	Double Scoring	8	b	CN4	10	ORG YEL	1-5	RED	Playfield	Feature	White	8-LP-54	520-5307-00
92	Mimic 1-R	8	c	CN2	5	RED BRN	1-4	RED	Playfield	Feature	RGB	8-LP-69	520-8650-00
93	Mimic 1-G	8	c	CN2	6	GRN BRN	1-4	RED	Playfield	Feature	RGB	8-LP-70	520-8650-00
94	Mimic 1 -B	8	c	CN2	7	BLU BRN	1-4	RED	Playfield	Feature	RGB	8-LP-71	520-8650-00
95	Mimic 2-R	8	c	CN2	8	RED ORG	1-4	RED	Playfield	Feature	RGB	8-LP-72	520-8650-00
96	Mimic 2-G	8	c	CN2	9	GRN ORG	1-4	RED	Playfield	Feature	RGB	8-LP-73	520-8650-00
97	Mimic 2-B	8	c	CN2	10	BLU ORG	1-4	RED	Playfield	Feature	RGB	8-LP-74	520-8650-00
98	Fizmo	8	c	CN2	11	YEL BRN	1-4	RED	Playfield	Feature	White	8-LP-75	520-8650-00
99	Treasure	8	c	CN2	12	YEL RED	1-4	RED	Playfield	Feature	White	8-LP-76	520-8650-00
100													
101	Left Orbit 1-R	9	b	CN3	3	RED BRN	1-3	RED	Playfield	Feature	RGB	9-LP-58	520-8682-00
102	Left Orbit 1-G	9	b	CN3	4	GRN BRN	1-3	RED	Playfield	Feature	RGB	9-LP-59	520-8682-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
103	Left Orbit 1-B	9	b	CN3	5	BLU BRN	1-3	RED	Playfield	Feature	RGB	9-LP-60	520-8682-00
104	Left Orbit 2-R	9	b	CN3	6	RED ORG	1-3	RED	Playfield	Feature	RGB	9-LP-61	520-8682-00
105	Left Orbit 2-G	9	b	CN3	7	GRN ORG	1-3	RED	Playfield	Feature	RGB	9-LP-62	520-8682-00
106	Left Orbit 2-B	9	b	CN3	8	BLU ORG	1-3	RED	Playfield	Feature	RGB	9-LP-63	520-8682-00
107	Cube	9	b	CN1	8	ORG BLU	1-3	RED	Playfield	Feature	White	9-LP-53	520-8682-00
108													
109													
110													
111	Dragon Tgt Left	9	b	LED19	-	-	-	-	Playfield	Feature	White	9-LP-66	520-8681-00
112	Dragon Tgt Cent	9	b	LED18	-	-	-	-	Playfield	Feature	White	9-LP-65	520-8681-00
113	Dragon Tgt Right	9	b	LED17	-	-	-	-	Playfield	Feature	White	9-LP-64	520-8681-00
114	(D)RAGON	9	b	LED27	-	-	-	-	Playfield	Feature	White	9-LP-74	520-8681-00
115	D(R)AGON	9	b	LED26	-	-	-	-	Playfield	Feature	White	9-LP-73	520-8681-00
116	DR(A)GON	9	b	LED25	-	-	-	-	Playfield	Feature	White	9-LP-72	520-8681-00
117	DRA(G)ON	9	b	LED10	-	-	-	-	Playfield	Feature	White	9-LP-57	520-8681-00
118	DRAG(O)N	9	b	LED9	-	-	-	-	Playfield	Feature	White	9-LP-56	520-8681-00
119	DRAGO(N)	9	b	LED1	-	-	-	-	Playfield	Feature	White	9-LP-48	520-8681-00
120													
121													
122													
123													
124													
125													
126													
127													
128	Dragon Eyes	9	b	CN4	4	ORG GRY	1-3	RED	Playfield	Feature	Amber	9-LP-67	520-8691-00
129	Dragon Head	9	b	CN4	5	ORG WHT	1-3	RED	Playfield	Feature	Amber	9-LP-68	520-8691-00
130	Dungeon Arrow-R	8	c	CN4	7	BLU RED	1-4	RED	Playfield	Feature	RGB	8-LP-82	520-5333-00
131	Dungeon Arrow-G	8	c	CN4	8	BLU GRN	1-4	RED	Playfield	Feature	RGB	8-LP-83	520-5333-00
132	Dungeon Arrow-B	8	c	CN4	9	BLU	1-4	RED	Playfield	Feature	RGB	8-LP-84	520-5333-00
133													
134													
135	Loop 1-R	9	a	CN1	4	RED YEL	1-3	RED	Playfield	Feature	RGB	9-LP-9	520-8649-00
136	Loop 1-G	9	a	CN1	5	GRN YEL	1-3	RED	Playfield	Feature	RGB	9-LP-10	520-8649-00
137	Loop 1-B	9	a	CN1	6	BLU YEL	1-3	RED	Playfield	Feature	RGB	9-LP-11	520-8649-00
138	Loop 2-R	9	a	CN1	7	RED VIO	1-3	RED	Playfield	Feature	RGB	9-LP-12	520-8649-00
139	Loop 2-G	9	a	CN1	8	GRN VIO	1-3	RED	Playfield	Feature	RGB	9-LP-13	520-8649-00
140	Loop 2-B	9	a	CN1	9	BLU VIO	1-3	RED	Playfield	Feature	RGB	9-LP-14	520-8649-00
141	Super Jackpot	9	a	CN1	10	YEL BLU	1-3	RED	Playfield	Feature	White	9-LP-15	520-8649-00
142	Dungeon	9	a	CN1	11	YEL VIO	1-3	RED	Playfield	Feature	White	9-LP-16	520-5307-00
143	Dungeon Left Tgt	9	a	LED27	-	-	-	-	Playfield	Feature	White	9-LP-44	520-8644-00
144	Center Ramp 1-R	9	a	LED26	-	-	-	-	Playfield	Feature	RGB	9-LP-41	520-8644-00
145	Center Ramp 1-G	9	a	LED26	-	-	-	-	Playfield	Feature	RGB	9-LP-42	520-8644-00
146	Center Ramp 1-B	9	a	LED26	-	-	-	-	Playfield	Feature	RGB	9-LP-43	520-8644-00
147	Center Ramp 2-R	9	a	LED28	-	-	-	-	Playfield	Feature	RGB	9-LP-45	520-8644-00
148	Center Ramp 2-G	9	a	LED28	-	-	-	-	Playfield	Feature	RGB	9-LP-46	520-8644-00
149	Center Ramp 2-B	9	a	LED28	-	-	-	-	Playfield	Feature	RGB	9-LP-47	520-8644-00
150	Critical Hit	9	a	LED25	-	-	-	-	Playfield	Feature	White	9-LP-40	520-8644-00
151													
152	Spinner 1-R	9	a	LED24	-	-	-	-	Playfield	Feature	RGB	9-LP-37	520-8644-00
153	Spinner 1-G	9	a	LED24	-	-	-	-	Playfield	Feature	RGB	9-LP-38	520-8644-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
154	Spinner 1-B	9	a	LED24	-	-	-	-	Playfield	Feature	RGB	9-LP-39	520-8644-00
155	Spinner 2-R	9	a	LED11	-	-	-	-	Playfield	Feature	RGB	9-LP-18	520-8644-00
156	Spinner 2-G	9	a	LED11	-	-	-	-	Playfield	Feature	RGB	9-LP-19	520-8644-00
157	Spinner 2-B	9	a	LED11	-	-	-	-	Playfield	Feature	RGB	9-LP-20	520-8644-00
158	Light Dungeon Crawl	9	a	LED1	-	-	-	-	Playfield	Feature	White	9-LP-8	520-8644-00
159	Inner Loop 1-R	9	a	LED23	-	-	-	-	Playfield	Feature	RGB	9-LP-34	520-8644-00
160	Inner Loop 1-G	9	a	LED23	-	-	-	-	Playfield	Feature	RGB	9-LP-35	520-8644-00
161	Inner Loop 1-B	9	a	LED23	-	-	-	-	Playfield	Feature	RGB	9-LP-36	520-8644-00
162	Inner Loop 2-R	9	a	LED22	-	-	-	-	Playfield	Feature	RGB	9-LP-31	520-8644-00
163	Inner Loop 2-G	9	a	LED22	-	-	-	-	Playfield	Feature	RGB	9-LP-32	520-8644-00
164	Inner Loop 2-B	9	a	LED22	-	-	-	-	Playfield	Feature	RGB	9-LP-33	520-8644-00
165													
166	Right Ramp 1-R	9	b	CN4	6	RED YEL	1	RED	Playfield	Feature	RGB	9-LP-69	520-8650-00
167	Right Ramp 1-G	9	b	CN4	7	GRN YEL	1	RED	Playfield	Feature	RGB	9-LP-70	520-8650-00
168	Right Ramp 1-B	9	b	CN4	8	BLU YEL	1	RED	Playfield	Feature	RGB	9-LP-71	520-8650-00
169	Right Ramp 2-R	9	b	CN5	3	RED VIO	1	RED	Playfield	Feature	RGB	9-LP-75	520-8650-00
170	Right Ramp 2-G	9	b	CN5	4	GRN VIO	1	RED	Playfield	Feature	RGB	9-LP-76	520-8650-00
171	Right Ramp 2-B	9	b	CN5	5	BLU VIO	1	RED	Playfield	Feature	RGB	9-LP-77	520-8650-00
172	Extra Ball	9	b	CN5	6	ORG	1	RED	Playfield	Feature	White	9-LP-78	520-8650-00
173	Choose Action	9	b	CN5	7	ORG BLK	1	RED	Playfield	Feature	White	9-LP-79	520-8650-00
174	Dungeon Right Tgt	9	a	CN1	12	YEL GRY	1-3	RED	Playfield	Feature	White	9-LP-17	520-5307-00
175	Cube (x2)-R	9	a	CN3	4	RED GRY	1-3	RED	Playfield	Feature	RGB	9-LP-21	520-5333-00
176	Cube (x2)-G	9	a	CN3	5	GRN GRY	1-3	RED	Playfield	Feature	RGB	9-LP-22	520-5333-00
177	Cube (x2)-B	9	a	CN3	6	BLU GRY	1-3	RED	Playfield	Feature	RGB	9-LP-23	520-5333-00
178	Magnet	9	a	CN3	13	YEL WHT	1-3	RED	Playfield	Feature	White	9-LP-30	520-8649-00
179	Right Orbit 1-R	9	a	CN3	10	RED WHT	1-3	RED	Playfield	Feature	RGB	9-LP-27	520-8649-00
180	Right Orbit 1-G	9	a	CN3	11	GRN WHT	1-3	RED	Playfield	Feature	RGB	9-LP-28	520-8649-00
181	Right Orbit 1-B	9	a	CN3	12	BLU WHT	1-3	RED	Playfield	Feature	RGB	9-LP-29	520-8649-00
182	Right Orbit 2-R	9	a	CN3	7	RED BLK	1-3	RED	Playfield	Feature	RGB	9-LP-24	520-8649-00
183	Right Orbit 2-G	9	a	CN3	8	GRN BLK	1-3	RED	Playfield	Feature	RGB	9-LP-25	520-8649-00
184	Right Orbit 2-B	9	a	CN3	9	BLU BLK	1-3	RED	Playfield	Feature	RGB	9-LP-26	520-8649-00
185	Jackpot	8	c	CN4	6	YEL GRN	1-4	RED	Playfield	Feature	White	8-LP-81	511-3071-00
186													
188	BB Gary 1	9	b	CN1	4	ORG BRN	1	RED	Playfield	Feature	White	9-LP-49	520-1076-00
189	BB Gary 2	9	b	CN1	5	ORG RED	1	RED	Playfield	Feature	White	9-LP-50	520-1076-00
190	BB Gary 3	9	b	CN1	6	ORG YEL	1	RED	Playfield	Feature	White	9-LP-51	520-1076-00
191	BB Spinner	9	b	CN1	7	ORG GRN	1	RED	Playfield	Feature	White	9-LP-52	520-1076-00
194													
195													
196													
197													
198													
199													
200	Coin Door GI	1	-	CN5	2	YEL	1	YEL-WHT	Coin Door	G.I.	White	1-LP-1	112-5033-08
201	Right GI-Wht (x10)	8	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	8-LP-0	112-5034-08F (520-7000-00 Bot Arch) 520-8652-00
202													
203	Right GI-Blu (x7)	8	-	CN15	7	BLU BLK	3	YEL BLU	Playfield	G.I.	Blu	8-LP-2	112-5034-05F

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
204													
205	Left GI-Wht (x9)	9	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	9-LP-0	112-5034-08F (520-7000-00 520-5307-00Bot Arch) 520-8652-00
206	Back Panel GI (x4)	9	-	CN15	6	RED BLK	2	YEL RED	Back Panel	G.I.	White	9-LP-1	112-5034-08F
207	Left GI-BLU (x5)	9	-	CN15	7	BLU BLK	3	YEL BLU	Playfield	G.I.	Blu	9-LP-2	112-5034-05F
208													
209													
210	Upper Left Flash	9		CN14	6	BRN	7/8	YEL	Playfield	Flash	White	9-LP-3	520-7000-00
211	Upper Right Flash	9		CN14	5	BRN WHT	7/8	YEL	Playfield	Flash	White	9-LP-4	520-7000-00
212	Lower Left Flash	8	c	CN4	11	ORG VIO	1-4	RED	Playfield	Flash	White	8-LP-86	520-7000-00
213	Lower Right Flash	8	c	CN4	12	ORG GRY	1-4	RED	Playfield	Flash	White	8-LP-87	520-7000-00
214	Dungeon Flash	9	-	CN14	4	BRN GRY	1/2	YEL	Playfield	Flash	White	9-LP-5	520-8676-00
215	Treasure Chest Flash	8	b	CN4	11	BRN GRY	1-5	RED	Playfield	Flash	White	8-LP-55	520-7000-00
216	Cave Flash	9	b	CN1	9	ORG VIO	1-3	RED	Playfield	Flash	Red	9-LP-54	520-8457-00
217	Lower Left Spotlight	8	c	CN4	10	ORG GRN	1-4	RED	Playfield	Flash	White	8-LP-85	113-5032-08
218	Lower Right Spotlight	9	b	CN1	10	ORG WHT	1-3	RED	Playfield	Flash	White	9-LP-55	113-5032-08
219													
220	Speaker 1-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-1	511-1135-00
221	Speaker 1-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-0	511-1135-00
222	Speaker 1-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-2	511-1135-00
223	Speaker 2-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-4	511-1135-00
224	Speaker 2-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-3	511-1135-00
225	Speaker 2-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-5	511-1135-00
226	Speaker 3-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-7	511-1135-00
227	Speaker 3-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-6	511-1135-00
228	Speaker 3-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-8	511-1135-00
229	Speaker 4-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-10	511-1135-00
230	Speaker 4-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-9	511-1135-00
231	Speaker 4-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-11	511-1135-00
232	Speaker 5-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-13	511-1135-00
233	Speaker 5-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-12	511-1135-00
234	Speaker 5-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-14	511-1135-00
235	Speaker 6-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-16	511-1135-00
236	Speaker 6-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-15	511-1135-00
237	Speaker 6-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-17	511-1135-00
238	Speaker 7-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-19	511-1135-00
239	Speaker 7-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-18	511-1135-00
240	Speaker 7-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-20	511-1135-00
241	Speaker 8-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-22	511-1135-00
242	Speaker 8-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-21	511-1135-00
243	Speaker 8-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-23	511-1135-00
244	Speaker 9-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-25	511-1135-00
245	Speaker 9-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-24	511-1135-00
246	Speaker 9-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-26	511-1135-00
247	Speaker 10-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-28	511-1135-00
248	Speaker 10-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-27	511-1135-00
249	Speaker 10-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-29	511-1135-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
250	Speaker 11-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-31	511-1135-00
251	Speaker 11-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-30	511-1135-00
252	Speaker 11-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-32	511-1135-00
253	Speaker 12-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-34	511-1135-00
254	Speaker 12-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-33	511-1135-00
255	Speaker 12-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-35	511-1135-00
256	Speaker 13-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-37	511-1135-00
257	Speaker 13-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-36	511-1135-00
258	Speaker 13-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-38	511-1135-00
259	Speaker 14-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-40	511-1135-00
260	Speaker 14-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-39	511-1135-00
261	Speaker 14-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-41	511-1135-00
262	Speaker 15-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-43	511-1135-00
263	Speaker 15-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-42	511-1135-00
264	Speaker 15-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-44	511-1135-00
265	Speaker 16-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-46	511-1135-00
266	Speaker 16-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-45	511-1135-00
267	Speaker 16-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-47	511-1135-00
268	Speaker 17-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-49	511-1135-00
269	Speaker 17-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-48	511-1135-00
270	Speaker 17-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-50	511-1135-00
271	Speaker 18-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-52	511-1135-00
272	Speaker 18-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-51	511-1135-00
273	Speaker 18-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-53	511-1135-00
274	Speaker 19-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-55	511-1135-00
275	Speaker 19-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-54	511-1135-00
276	Speaker 19-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-56	511-1135-00
277	Speaker 20-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-58	511-1135-00
278	Speaker 20-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-57	511-1135-00
279	Speaker 20-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-59	511-1135-00
280	Speaker 21-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-61	511-1135-00
281	Speaker 21-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-60	511-1135-00
282	Speaker 21-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-62	511-1135-00
283	Speaker 22-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-64	511-1135-00
284	Speaker 22-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-63	511-1135-00
285	Speaker 22-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-65	511-1135-00
286	Speaker 23-R	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-67	511-1135-00
287	Speaker 23-G	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-66	511-1135-00
288	Speaker 23-B	7	-	CN1	-	-	-	-	Cabinet	Feature	RGB	7-LP-68	511-1135-00
289													
290													
291													

Continued on next page...

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LIGHT REFERENCE MAP

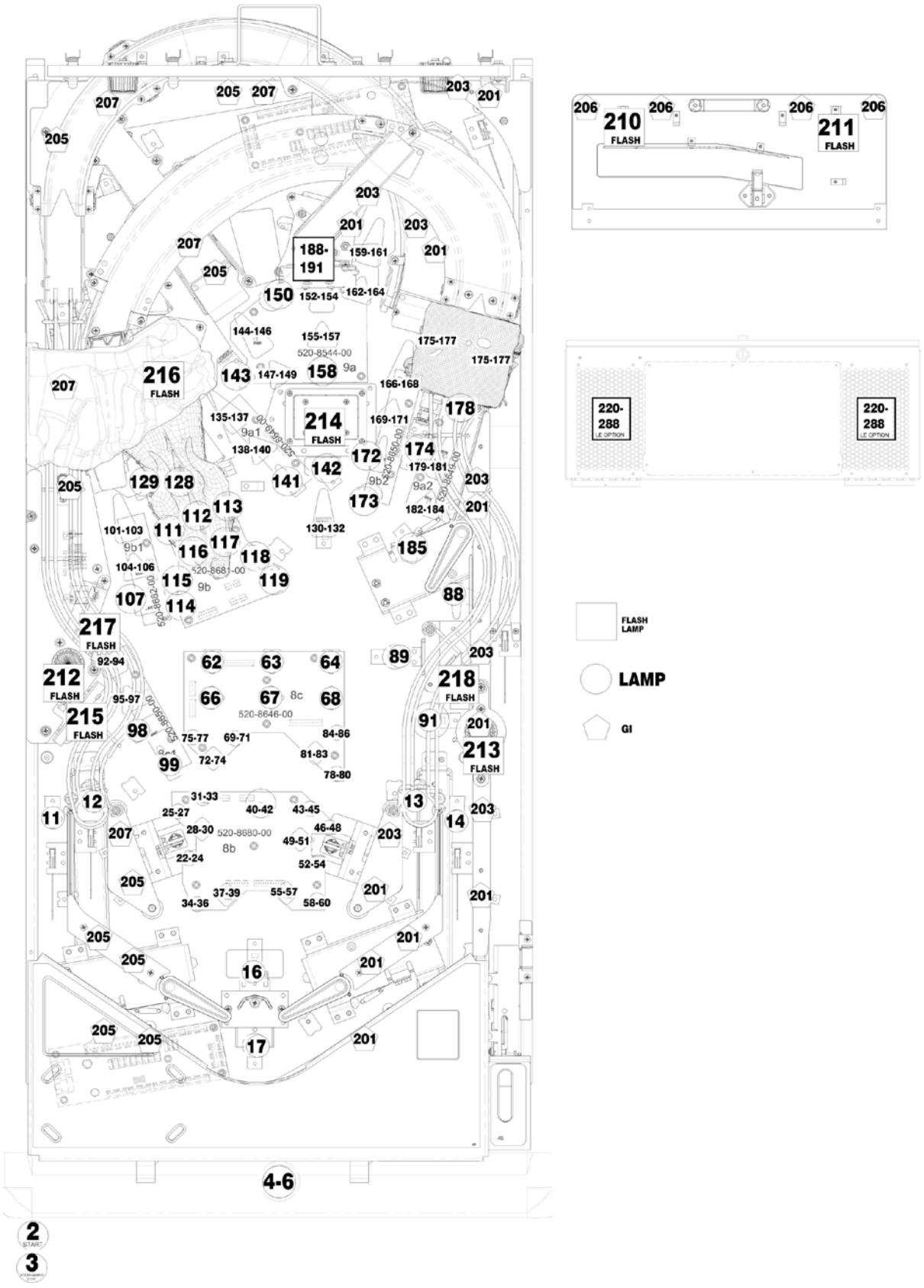

Figure 3.4.1. Playfield light locations (top view).

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3.5 MOTOR REFERENCE

1	Dragon Lt/Rt Stepper	10	-	CN1	-	-	-	-	Playfield	Motor	-	10-MTR-A	520-5781-02
2													
3	Dragon Up/Dn Stepper	10	-	CN3	-	-	-	-	Playfield	Motor	-	10-MTR-B	520-5781-02
4													
5													
6													
7													
8													
9													
10													

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4. ELECTRONIC PINOUTS AND SCHEMATICS

4.1 SPIKE-2 CPU NODE 0

509-1003-01
DIRECT SWITCH MAPPING (CN25)

The coin-door diagnostic switches are connected directly to the CPU node via the Cabinet Node. Note that both the CPU and Cabinet nodes are required for diagnostic switch operation.

ID	Name	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
C1	DIP 1	-	-	-	-	-	CPU Node		0-SW-0	-
C2	DIP 2	-	-	-	-	-	CPU Node		0-SW-1	-
C3	DIP 3	-	-	-	-	-	CPU Node		0-SW-2	-
C4	DIP 4	-	-	-	-	-	CPU Node		0-SW-3	-
C5	DIP 5	-	-	-	-	-	CPU Node		0-SW-4	-
C6	DIP 6	-	-	-	-	-	CPU Node		0-SW-5	-
C7	DIP 7	-	-	-	-	-	CPU Node		0-SW-6	-
C8	DIP 8	-	-	-	-	-	CPU Node		0-SW-7	-
C9	Service Select	CN25	1	LGN-GRY	11	BLK-WHT	Coin Door		0-SW-9	180-5192-04
C10	Service Plus	CN25	2	LGN-VIO	11	BLK-WHT	Coin Door		0-SW-10	180-5192-02
C11	Service Minus	CN25	3	LGN-BLU	11	BLK-WHT	Coin Door		0-SW-11	180-5192-02
C12	Service Back	CN25	4	LGN-BLK	11	BLK-WHT	Coin Door		0-SW-12	180-5192-00

CONNECTORS

ID	Connector Type	Description
CN1	5-Pin .156” Header	Backbox 2-channel amplified speaker out
CN2	3-Pin .100” Header	Console Port
CN3	7-Pin .100” Header	Headphone connector
CN4	2-Pin .156”	Cabinet 1-channel amplified speaker out
CN5	7-Pin .100” Header	Line In/Out
CN6	34 Pin 2.00mm Header	LCD display connector
CN7	5-Pin .156” Header	48V supply from main power supply
CN8	6-Pin .100” Header	SPI Serial
CN9	USB	USB connector - for software updates, audit dumps, and expansion modules
CN9	USB	USB connector - for software updates, audit dumps, and expansion modules
CN10	HDMI	HDMI Out
CN11	RJ45	SPIKE node bus - to cabinet node N1
CN12	RJ45	SPIKE node bus - To Topper accessory Kit
CN13	SD CARD	SD Card connector
CN14	5-Pin .100” Header	LCD Backlight
CN15	3-Pin .100” Header	Backbox Light
CN16	4-Pin .100” Header	3.3v / 5v / 12v
CN17	ETHERNET	ETHERNET connector
CN21	SATA Header	SATA connector
CN22	RJ45	SPIKE node bus - to playfield node
CN25	12-Pin .100” Header	Dedicated switch inputs - service, volume switches

COMPONENTS

ID	Name
S1	DIP Switches
S2	Reset Switch
SD CARD (CN13)	For system SD card. Note: only to be removed if instructed to by Stern Service.
BT1	BR1225 3V Lithium battery for game clock between power cycles

STATUS LEDS

LED ID	Name	Color	Description
48V	+48V Supply In	Red	ON: Main system power is connected. OFF: No 48V system power. Check power supply connections, cables, and fuses.
3.3V	+3.3V Logic	Red	ON: Logic power supply is good. OFF: Logic power supply bad, call tech support.
5V	+5V Logic	Red	ON: Logic power supply is good. OFF: Logic power supply bad, call tech support.
12V	+12V Backbox Illumination	Red	ON: Back box LED power good. OFF: Backbox LED power bad, call tech support.
VA	+30V Audio	Red	ON: Audio power supply is good. OFF: Audio power supply off, call tech support.
VNB	+9V Node Bus	Red	Power for the Node bus. ON: Power for node bus good. OFF: Power to node bus not detected, call tech support.
5V (CPU)	+5V Logic	Red	ON: Logic power supply is good. OFF: Logic power supply bad, call tech support.
SDIO ACT	Not Used	Red	Should remain unlit as it is not currently used.
STATUS	CPU Heartbeat, System Status	Red	Double blink ~1/2 second: Good, Processor running. OFF: Processor not running, call tech support.
µSD ACT	Activity indicator for micro SD Card	Red	Should blink rapidly when reading or writing to micro SD card.
D23	Netbridge Status	Red	Should blink once every ~1/2 second.

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SPIKE-2 CPU NODE 0 CONTINUED

AUDIO PINOUTS

ID	Type	Pin	Description	Minimum Impedance	Max Power (RMS)	Wire Color
CN1	.156" 5-pin Header	1	Speaker Right Ground (-)	4 Ohms	-	BLK-WHT
		2	Speaker Right (+)	4 Ohms	20W	RED-WHT
		3	n/c	-	-	
		4	Speaker Left Ground (-)	4 Ohms	-	BLK-RED
		5	Speaker Left (+)	4 Ohms	20W	RED-BLK
CN3	.100" 7-pin Header	1	n/c	-	-	
		2	L-HP	16 Ohms	15 mW	
		3	R-HP	16 Ohms	15 mW	
		4	n/c	-	-	
		5	Headphone Detect	-	-	
		6	Headphone vol +	-	-	
		7	Headphone vol -	-	-	
CN4	.156" 2-pin Header	1	Woofer Ground (-)	8 Ohms	-	YEL-BLK
		2	Woofer Out (+)	8 Ohms	40W	YEL-WHT
CN5	.100" 7-pin Header	1	n/c	-	-	
		2	L-IN	30K Ohms	0.6VRMS	
		3	R-IN	30K Ohms	0.6VRMS	
		4	n/c	-	-	
		5	L-OUT	10K Ohms	1.5V	
		6	R-OUT	10K Ohms	1.5V	
		7	Woofer Line Out	10K Ohms	1.5V	

COUNTRY CODES (DIP S2)

	DIP S2							
Country	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
USA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Austria	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Australia	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
Belgium	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
Canada 1	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Canada 2	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
China	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
Croatia	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
Denmark	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
Finland	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
France	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
Germany	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
Greece	ON	ON	ON	ON	OFF	OFF	OFF	OFF
Italy	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
Japan	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
Middle East	ON	ON	ON	OFF	ON	OFF	OFF	OFF
Netherlands	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
New Zealand	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
Norway	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
Portugal	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
Russia	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
S. Africa	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
Spain	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
Sweden	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
Switzerland	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
Taiwan	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
United Kingdom	OFF	ON	ON	ON	OFF	OFF	OFF	OFF

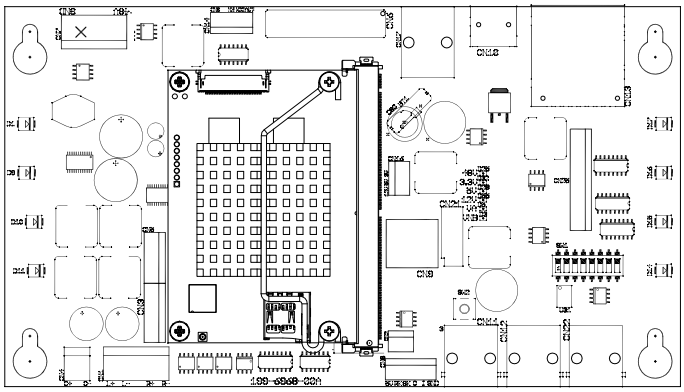

Figure 4.1.1. SPIKE 2 CPU Node connector detail.

COIN DOOR SERVICE SWITCH WIRING

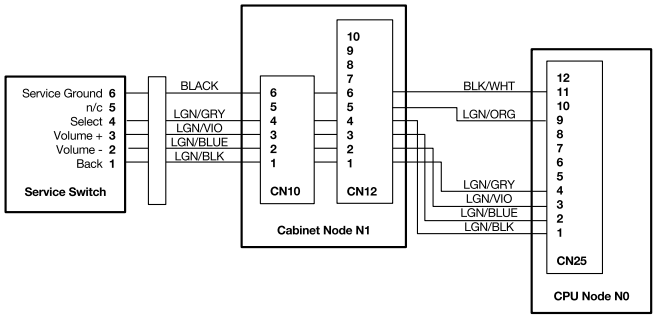

Figure 4.1.2. Service switch wiring. Note that the Cabinet Node must be present and CN10 and CN12 connected for the Coin Door Service Switches to function correctly.

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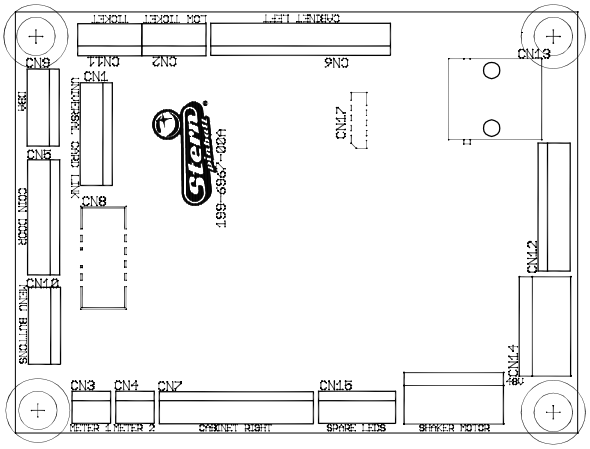
4.2 CABINET NODE 1

520-6967-72

ID	Type	Pin	Description	Wire Color
CN1	.100" 8-Pin Header Universal Card Link	1	12V	-
		2	Coin 1	-
		3	Meter 1	-
		4	N/C	-
		5	Notch	-
		6	Coin Enable	-
		7	Ticket Enable	-
		8	Ground	-
CN2	.100" 5-Pin Header Low Ticket	1	Ground	-
		2	Ticket Low sw.	-
		3	Key	-
		4	Ticket Low	-
		5	5V Out	-
CN3	.100" 3-Pin Header Meter 1	1	Meter 12V (+)	RED
		2	Meter (-)	BLK
		3	N/C	-
CN4	.100" 3-Pin Header Meter 2	1	Meter 12V (+)	RED
		2	Meter (-)	BLK
		3	N/C	-
CN5	.100" 9-Pin Header	1	5V Out	YEL/WHT
		2	Coin LED Out	YEL
		3	Ground	BLK
		4	Slam Tilt In	LGN/RED
		5	Coin 5	PNK/GRN*
		6	Coin 4	PNK/YEL*
		7	Coin 3	PNK/ORN*
		8	Coin 2	PNK/RED*
		9	Coin 1	PNK/BRN*
CN6	.100" 14-Pin Header Cabinet Left	1	5V LED Power	RED
		2	Start 2 LED	YEL-RED
		3	Start 1 LED	YEL-BRN
		4	Spare LED	-
		5	Ground	BLK-WHT
		6	Spare Left	-
		7	Tilt Input	WHT
		8	Door Open	-
		9	Start 2 Switch	GRY-WHT
		10	Start 1 Switch	GRY
		11	N/C	-
		12	N/C	-
		13	N/C	-
		14	N/C	-
CN7	.100" 12-Pin Header Cabinet Right	1	5V LED Power	RED
		2	Plunge 2 LED	RED-WHT
		3	Plunge 1 LED	GRN-WHT
		4	Spare LED 2	BLU-WHT
		5	Ground	BLK-WHT
		6	Spare Right In	-
		7	Plunge 2 Switch	-
		8	Plunge 1 Switch	-
		9	N/C	-
		10	N/C	-
		11	N/C	-
		12	N/C	-
CN8	.100" 10-Pin Header Dual Row Electronic Coin Mech	1	Ground	-
		2	12V	-
		3	Coin 5	-
		4	Coin 6	-
		5	N/C	-
		6	Coin Enable/Inhibit (+)	-
		7	Coin 1	-
		8	Coin 2	-
		9	Coin 3	-
		10	Coin 4	-



CN9	.100" 6-Pin Header Dollar Bill Acceptor	1	Coin Enable/DBA Inhibit (-)	BLK
		2	Coin Enable/DBA Inhibit (+)	-
		3	Key	Key
		4	DBA 12V	ORG
		5	Coin 6 / DBA Credit	-
		6	Ground	BLK-ORG
CN10	.100" 6-Pin Header Service Switch In	1	Service Back (To Coindoor)	LGN-BLK
		2	Service Down (To Coindoor)	LGN-BLU
		3	Service Up (To Coindoor)	LGN-VIO
		4	Service Select (To Coindoor)	LGN-GRY
		5	Key	Key
		6	Service Ground (To Coin-door)	BLK
CN11	.100" 5-Pin Header Ticket Dispenser	1	12V	RED
		2	N/C	-
		3	Ticket Dispenser Enable	WHT
		4	Ground	BLK
		5	Ticket Dispenser Notch	BLU
CN12	.100" 10-Pin Header CPU Direct Switches	1	Service Back (To CPU)	LGN-BLK
		2	Service Down (To CPU)	LGN-BLU
		3	Service Up (To CPU)	LGN-VIO
		4	Service Select (To CPU)	LGN-GRY
		5	Power Present	LGN-ORG
		6	Service Ground (To CPU)	BLK-WHT
		7	N/C	-
		8	N/C	-
		9	N/C	-
		10	N/C	-
CN14	.156" 5-Pin Header Power Input	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY-YEL
CN15	.100" 6-Pin Header Spare LED's	1	5V LED Power	-
		2	Key	Key
		3	Spare LED 3	-
		4	Spare LED 4	-
		5	Spare LED 5	-
		6	Spare LED 6	-
CN16	.156" 5-Pin Header Shaker Motor	1	Shaker Motor (-)	BLU
		2	Shaker Motor (-)	-
		3	Shaker Motor (+)	-
		4	Key	Key
		5	Shaker Motor (+)	RED
			*Varies by country model	

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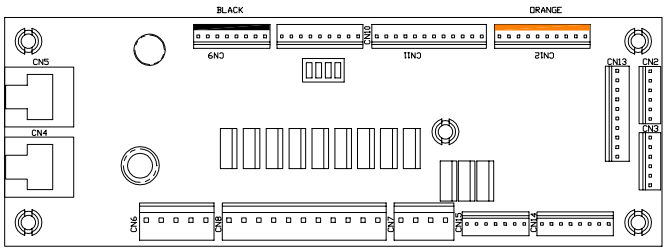
4.3 LOWER PLAYFIELD 48V DRIVER PINOUT NODE 8

520-1070 / 520-1057-00



ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 8 - OFF-OFF-OFF-OFF	-
CN4	RJ45	-	SPIKE Node Bus	Multi
CN5	RJ45	-	SPIKE Node Bus	Multi
CN6	.156" 5-Pin Header Node Power	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY
CN7	.156" 4-Pin Header (White)	1	48V Driver Power	GRY ORG
		2	8-DR-8 Driver Return	YEL RED
		3	8-DR-6 Driver Return	YEL BLK
		4	8-DR-7 Driver Return	YEL BRN
CN8	.156 11-Pin Header (White)	1	48V Driver Power	GRY ORG
		2	48V Driver Power	GRY ORG
		3	48V Driver Power	GRY ORG
		4	48V Driver Power	GRY ORG
		5	8-DR-0 Driver Return	ORG GRN
		6	8-DR-5 Driver Return	ORG YEL
		7	8-DR-1 Driver Return	ORG GRY
		8	8-DR-8 Driver Return	-
		9	8-DR-4 Driver Return	ORG WHT
		10	8-DR-2 Driver Return	ORG VIO
		11	8-DR-3 Driver Return	ORG BLU
CN9	.100" 8-Pin Header (Black)	1	V+	-
		2	V+	-
		3	8-SW-24 Switch	GRY RED
		4	8-SW-25 Switch	GRY BRN
		5	8-SW-26 Switch	VIO WHT
		6	8-SW-27 Switch	-
		7	Ground	BLK GRN
		8	Ground	BLK VIO
CN10	.100" 9-Pin Header	1	V+	-
		2	8-SW-28 Switch	GRY WHT
		3	8-SW-29 Switch	GRY VIO
		4	8-SW-30 Switch	GRY BLU
		5	8-SW-31 Switch	GRY GRN
		6	8-SW-16 Switch	GRY YEL
		7	Ground	BLK GRN
		8	Ground	BLK GRN
		9	Ground	BLK GRN
CN11	.100" 12-Pin Header	1	V+	-
		2	8-SW-26 Switch	-
		3	8-SW-27 Switch	LGN BRN
		4	8-SW-17 Switch	LGN RED
		5	8-SW-18 Switch	LGN ORG
		6	8-SW-19 Switch	LGN YEL
		7	8-SW-20 Switch	LGN BLU
		8	8-SW-21 Switch	LGN VIO
		9	8-SW-22 Switch	LGN GRY
		10	8-SW-23 Switch	-
		11	Ground	BLK ORG
		12	Ground	BLK ORG
CN12	.100" 10-Pin Header (Orange)	1	V+	-
		2	8-SW-8 Switch	-
		3	8-SW-9 Switch	-
		4	8-SW-10 Switch	WHT ORG
		5	8-SW-11 Switch	WHT YEL
		6	8-SW-12 Switch	WHT GRN
		7	8-SW-13 Switch	WHT BLU
		8	8-SW-14 Switch	-
		9	8-SW-15 Switch	PNK BRN
		10	Ground	BLK RED
CN13	.100" 10-Pin Header	1	V+	-
		2	8-SW-0 Switch	-
		3	8-SW-1 Switch	-
		4	8-SW-2 Switch	-
		5	8-SW-3 Switch	-
		6	8-SW-4 Switch	-
		7	8-SW-5 Switch	-
		8	8-SW-6 Switch	-
		9	8-SW-7 Switch	-
		10	Ground	-
CN14	.100" 8-Pin Header	1	Ground	-
		2	8-LP-7 Driver Return	-
		3	8-LP-6 Driver Return	-
		4	8-LP-5 Driver Return	-
		5	8-LP-4 Driver Return	-
		6	8-LP-3 Driver Return	-
		7	LED V+	-
		8	LED V+	-
CN15	.100" 7-Pin Header	1	LED V+	YEL BLK
		2	LED V+	-
		3	LED V+	YEL BLU
		4	-	-
		5	8-LP-0 GI Return	WHT BLK
		6	8-LP-1 GI Return	-
		7	8-LP-2 GI Return	BLU BLK
CN2	.100" 6-Pin Header, Node Extension Bus	1	Ground	BLK
		2	DIN	VIO BLK
		3	DOUT	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	V+	RED
CN3	.100" 6-Pin Header, Node Extension Bus	1	Ground	BLK
		2	DIN	VIO BLK
		3	DOUT	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	V+	RED

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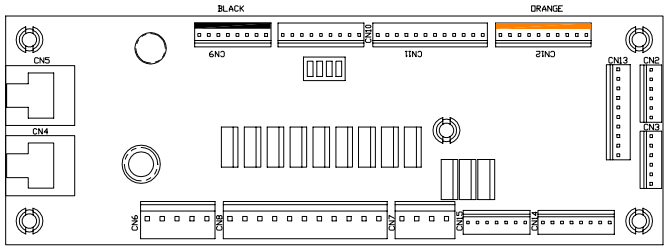
4.4 MID UPPER PLAYFIELD 48V DRIVER PINOUT NODE 9

520-1070 / 520-1057-00



ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 9 - OFF-OFF-ON-OFF	-
CN4	RJ45	-	SPIKE Node Bus	Multi
CN5	RJ45	-	SPIKE Node Bus	Multi
CN6	.156" 5-Pin Header Node Power	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY
CN7	.156" 4-Pin Header (White)	1	48V Driver Power	GRY BRN
		2	9-DR-8 Driver Return	YEL ORG
		3	9-DR-6 Driver Return	ORG BLK
		4	9-DR-7 Driver Return	YEL BLU
CN8	.156 11-Pin Header (White)	1	48V Driver Power	GRY BRN
		2	48V Driver Power	GRY BRN
		3	48V Driver Power	GRY BRN
		4	48V Driver Power	GRY BRN
		5	9-DR-0 Driver Return	YEL GRY
		6	9-DR-5 Driver Return	YEL VIO
		7	9-DR-1 Driver Return	-
		8	9-DR-8 Driver Return	-
		9	9-DR-4 Driver Return	-
		10	9-DR-2 Driver Return	BRN RED
		11	9-DR-3 Driver Return	ORG BRN
CN9	.100" 8-Pin Header	1	V+	-
		2	V+	-
		3	9-SW-24 Switch	-
		4	9-SW-25 Switch	-
		5	9-SW-26 Switch	-
		6	9-SW-27 Switch	-
		7	Ground	-
		8	Ground	-
CN10	.100" 9-Pin Header	1	V+	RED
		2	9-SW-28 Switch	GRY BLK
		3	9-SW-29 Switch	GRY BRN
		4	9-SW-30 Switch	GRY RED
		5	9-SW-31 Switch	GRY ORG
		6	9-SW-16 Switch	GRY YEL
		7	Ground	-
		8	Ground	-
		9	Ground	BLK BLU
CN11	.100" 12-Pin Header	1	V+	RED
		2	9-SW-26 Switch	-
		3	9-SW-27 Switch	-
		4	9-SW-17 Switch	TAN ORG
		5	9-SW-18 Switch	TAN YEL
		6	9-SW-19 Switch	TAN GRN
		7	9-SW-20 Switch	TAN BLU
		8	9-SW-21 Switch	TAN VIO
		9	9-SW-22 Switch	TAN WHT
		10	9-SW-23 Switch	TAN
		11	Ground	BLK GRY
		12	Ground	BLK GRY
CN12	.100" 10-Pin Header (Orange)	1	V+	RED
		2	9-SW-8 Switch	WHT BRN
		3	9-SW-9 Switch	WHT RED
		4	9-SW-10 Switch	-
		5	9-SW-11 Switch	WHT YEL
		6	9-SW-12 Switch	-
		7	9-SW-13 Switch	WHT BLU
		8	9-SW-14 Switch	WHT VIO
		9	9-SW-15 Switch	WHT GRY
		10	Ground	BLK WHT
CN13	.100" 10-Pin Header	1	V+	-
		2	9-SW-0 Switch	PNK RED
		3	9-SW-1 Switch	PNK ORG
		4	9-SW-2 Switch	PNK YEL
		5	9-SW-3 Switch	PNK GRN
		6	9-SW-4 Switch	-
		7	9-SW-5 Switch	-
		8	9-SW-6 Switch	-
		9	9-SW-7 Switch	-
		10	Ground	BLK BRN
CN14	.100" 8-Pin Header	1	Ground	-
		2	9-LP-7 Driver Return	-
		3	9-LP-6 Driver Return	-
		4	9-LP-5 Driver Return	BRN GRY
		5	9-LP-4 Driver Return	BRN WHT
		6	9-LP-3 Driver Return	BRN
		7	LED V+	-
		8	LED V+	YEL
CN15	.100" 7-Pin Header	1	LED V+	YEL BLK
		2	LED V+	YEL RED
		3	LED V+	YEL BLU
		4	-	-
		5	9-LP-0 GI Return	WHT BLK
		6	9-LP-1 GI Return	RED BLK
		7	9-LP-2 GI Return	BLU BLK
CN2	.100" 6-Pin Header, Node Extension Bus	1	Ground	-
		2	DIN	-
		3	DOUT	-
		4	SCK	-
		5	RCK	-
		6	V+	-
CN3	.100" 6-Pin Header, Node Extension Bus	1	Ground	BLK
		2	DIN	VIO BLK
		3	DOUT	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	V+	RED

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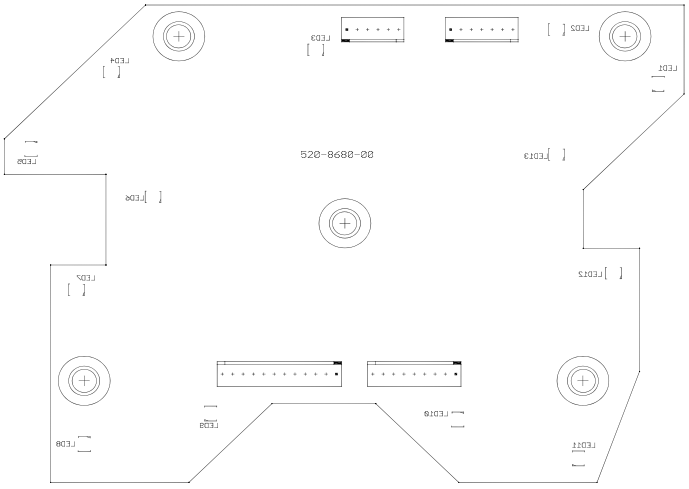
4.5 MID BOTTOM LED BOARD 8B

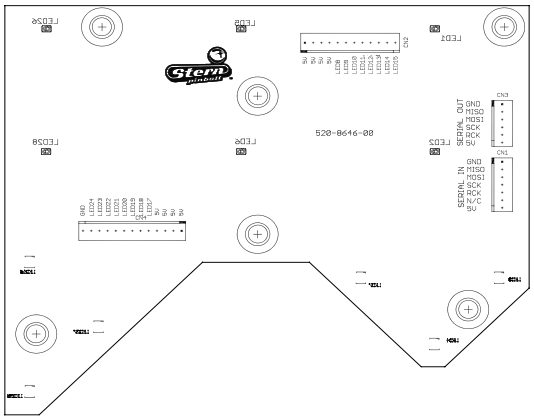
520-8680-00



ID	Type	Pin	Description	Wire Color
CN1	.100 7-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	NC	-
		7	5V	RED
CN2	.100" 6-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	5V	RED
CN3	.100" 9-Pin Header	1	5V	RED
		2	5V	-
		3	5V	-
		4	5V	-
		5	5V	-
		6	LED14	BRN RED
		7	LED15	BRN ORG
		8	LED16	BRN GRN
		9	GND	-
CN4	.100" 12-Pin Header	1	5V	RED
		2	5V	RED
		3	5V	RED
		4	5V	-
		5	5V	-
		6	LED17	BRN VIO
		7	LED18	BRN YEL
		8	LED19	BRN BLU
		9	LED20	ORG BRN
		10	LED21	ORG YEL
		11	LED22	BRN GRY
		12	GND	-

4.6 6 WHITE - 6 RED CENTER MID LED BOARD 8C

520-8646-00



ID	Type	Pin	Description	Wire Color
CN1	.100 7-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	NC	-
		7	5V	RED
CN2	.100" 12-Pin Header	1	5V	RED
		2	5V	-
		3	5V	-
		4	5V	-
		5	LED8	RED BRN
		6	LED9	GRN BRN
		7	LED10	BLU BRN
		8	LED11	RED ORG
		9	LED12	GRN ORG
		10	LED13	BLU ORG
		11	LED14	YEL BRN
		12	LED15	YEL RED
CN3	.100" 6-Pin Header	1	GND	-
		2	MISO	-
		3	MOSI	-
		4	SCK	-
		5	RCK	-
		6	5V	-
CN4	.100" 13-Pin Header	1	5V	RED
		2	5V	RED
		3	5V	RED
		4	5V	-
		5	LED17	YEL ORG
		6	LED18	YEL GRN
		7	LED19	RED VIO
		8	LED20	GRN VIO
		9	LED21	BLU VIO
		10	LED22	ORG GRN
		11	LED23	ORG VIO
		12	LED24	ORG GRY
		13	GND	-

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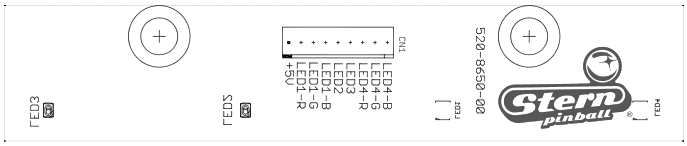
4.7 2 WHITE - 2 RED BOTTOM LEFT LED BOARD 8C1

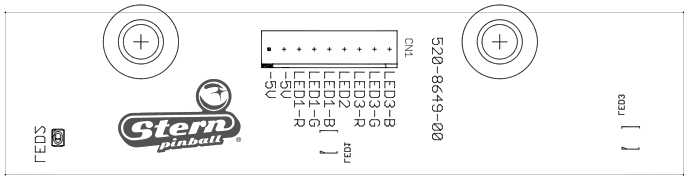
520-8650-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 9-Pin Header	1	5V	RED
		2	LED1-R	RED ORG
		3	LED1-G	GRN ORG
		4	LED1-B	BLU ORG
		5	LED2	YEL BRN
		6	LED3	YEL RED
		7	LED4-R	RED BRN
		8	LED4-G	GRN BRN
		9	LED4-B	BLU BRN

4.8 1 WHITE - 2 RED TOP CENTER LED BOARD 9A1

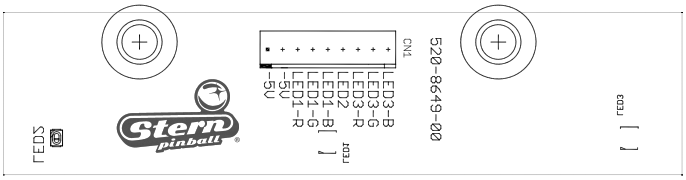
520-8649-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 9-Pin Header	1	5V	RED
		2	5V	-
		3	LED1-R	RED VIO
		4	LED1-G	GRN VIO
		5	LED1-B	BLU VIO
		6	LED2	YEL BLU
		7	LED3-R	RED YEL
		8	LED3-G	GRN YEL
		9	LED3-B	BLU YEL

4.9 1 WHITE - 2 RED TOP CENTER LED BOARD 9A2

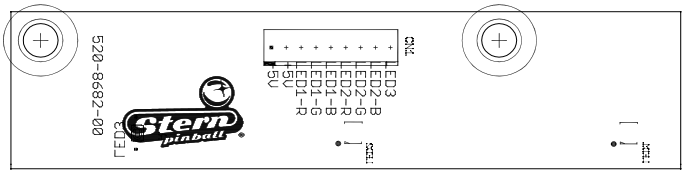
520-8649-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 9-Pin Header	1	5V	RED
		2	5V	-
		3	LED1-R	RED WHT
		4	LED1-G	GRN WHT
		5	LED1-B	BLU WHT
		6	LED2	YEL WHT
		7	LED3-R	RED BLK
		8	LED3-G	GRN BLK
		9	LED3-B	BLU BLK

4.10 2 WHITE - 2 RED BOTTOM LEFT LED BOARD 9B1

520-8682-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 9-Pin Header	1	5V	RED
		2	5V	-
		3	LED1-R	RED BRN
		4	LED1-G	GRN BRN
		5	LED1-B	BLU BRN
		6	LED2-R	RED ORG
		7	LED2-G	GRN ORG
		8	LED2-B	BLU ORG
		9	LED3	ORG BLU

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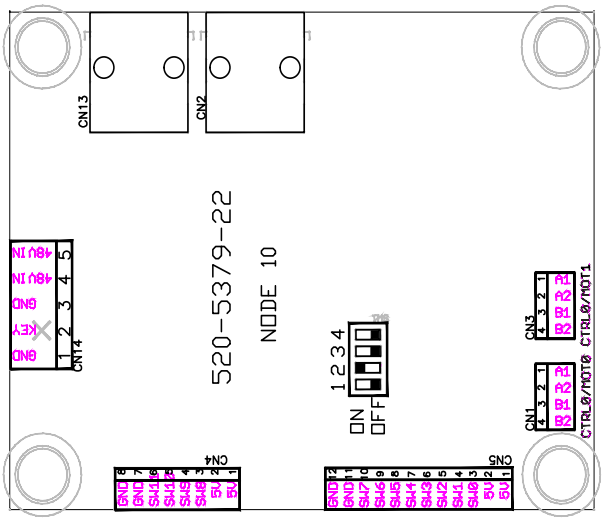
4.11 NODE 10 STEPPER MOTOR BD

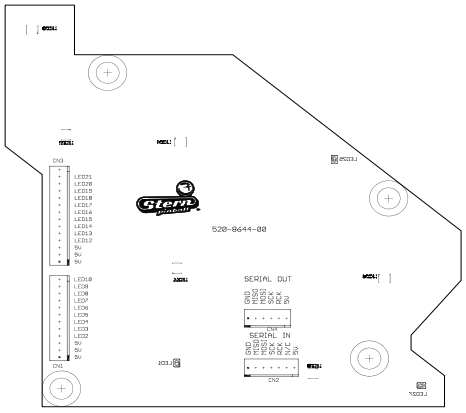
520-5379-22



ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 10 - OFF-ON-OFF-OFF	-
CN2	RJ45	-	SPIKE Node Bus	Multi
CN13	RJ45	-	SPIKE Node Bus	Multi
CN1	.100" 4-Pin Header	1	COM0A1	RED
		2	COM0A2	BLU
		3	COM0B1	GRN
		4	COM0B2	BLK
CN3	.100" 4-Pin Header	1	COM1A1	RED
		2	COM1A2	BLU
		3	COM1B1	GRN
		4	COM1B2	BLK
CN4	.100" 8-Pin Header	1	V+	-
		2	V+	-
		3	10-SW-8 Switch	-
		4	10-SW-9 Switch	-
		5	10-SW-10 Switch	-
		6	10-SW-11 Switch	-
		7	Ground	-
		8	Ground	-
CN5	.100" 12-Pin Header	1	V+	RED WHT
		2	V+	RED
		3	10-SW-0 Switch	WHT GRY
		4	10-SW-1 Switch	WHT
		5	10-SW-2 Switch	WHT VIO
		6	10-SW-3 Switch	-
		7	10-SW-4 Switch	-
		8	10-SW-5 Switch	-
		9	10-SW-6 Switch	-
		10	10-SW-7 Switch	-
		11	Ground	BLK WHT
		12	Ground	BLK
CN14	.156" 5-Pin Header	1	GND	BLK
		2	KEY	Key
		3	GND	-
		4	+48V	-
		5	+48V	GRY

4.12 3 WHITE - 6 RED TOP CENTER LED BOARD 9A

520-8644-00



ID	Type	Pin	Description	Wire Color
CN1	.100 12-Pin Header	1	5V	RED
		2	5V	RED
		3	5V	-
		4	LED2	RED YEL
		5	LED3	GRN YEL
		6	LED4	BLU YEL
		7	LED5	RED VIO
		8	LED6	GRN VIO
		9	LED7	BLU VIO
		10	LED8	YEL BLU
		11	LED9	YEL VIO
		12	LED10	YEL GRY
CN2	.100" 7-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	NC	-
		7	5V	RED
CN3	.100" 14-Pin Header	1	5V	RED
		2	5V	RED
		3	5V	-
		4	LED12	RED GRY
		5	LED13	GRN GRY
		6	LED14	BLU GRY
		7	LED15	RED BLK
		8	LED16	GRN BLK
		9	LED17	BLU BLK
		10	LED18	RED WHT
		11	LED19	GRN WHT
		12	LED20	BLU WHT
		13	LED21	YEL WHT
		14	GND	-
CN4	.100" 6-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	5V	RED

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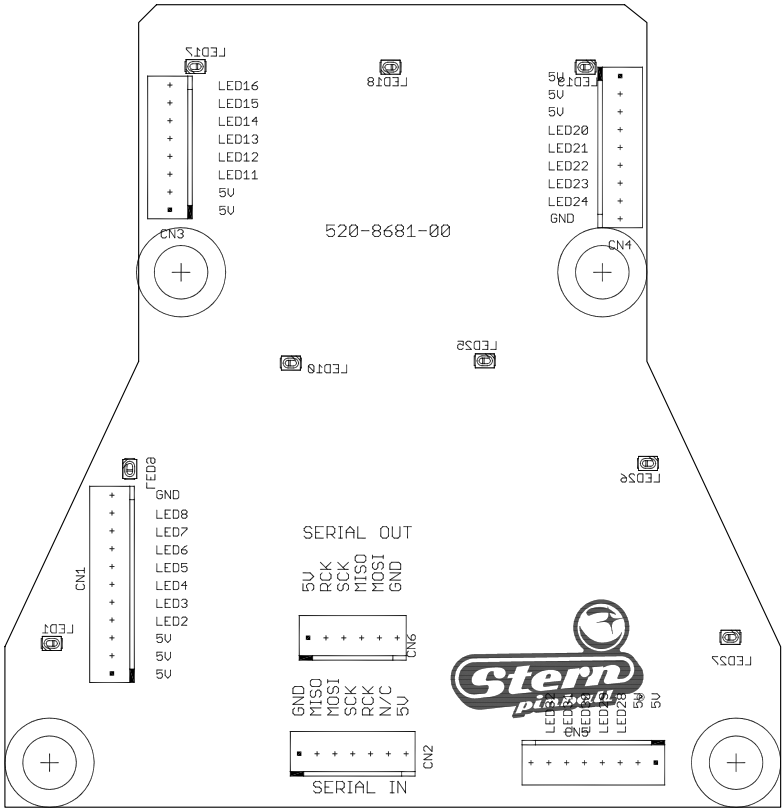
4.13 CENTER MID LED BOARD 9B

520-8681-00



ID	Type	Pin	Description	Wire Color
CN1	.100 11-Pin Header	1	5V	RED
		2	5V	RED
		3	5V	RED
		4	LED2	ORG BRN
		5	LED3	ORG RED
		6	LED4	ORG YEL
		7	LED5	ORG GRN
		8	LED6	ORG BLU
		9	LED7	ORG VIO
		10	LED8	ORG WHT
		11	GND	-
CN2	.100" 7-Pin Header	1	GND	BLK
		2	MISO	VIO BLK
		3	MOSI	VIO BRN
		4	SCK	VIO RED
		5	SRCK	VIO ORG
		6	N/C	-
		7	5V	RED
CN3	.100" 8-Pin Header	1	5V	RED
		2	5V	-
		3	LED11	RED BRN
		4	LED12	GRN BRN
		5	LED13	BLU BRN
		6	LED14	RED ORG
		7	LED15	GRN ORG
		8	LED16	BLU ORG

ID	Type	Pin	Description	Wire Color
CN4	.100" 9-Pin Header	1	5V	RED
		2	5V	-
		3	5V	-
		4	LED20	ORG GRY
		5	LED21	ORG WHT
		6	LED22	RED YEL
		7	LED23	GRN YEL
		8	LED24	BLU YEL
		9	GND	-
CN5	.100" 8-Pin Header	1	5V	RED
		2	5V	-
		3	LED28	RED VIO
		4	LED29	GRN VIO
		5	LED30	BLU BIO
		6	LED31	ORG
		7	LED32	ORG BLK
		8	GND	-
CN6	.100" 6-Pin Header	1	GND	-
		2	MISO	-
		3	MOSI	-
		4	SCK	-
		5	RCK	-
		6	5V	-

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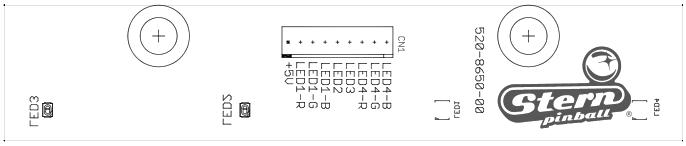
4.14 2 WHITE - 2 RED BOTTOM LEFT LED BOARD 9B2

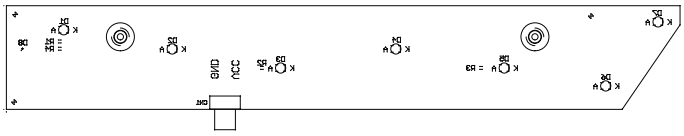
520-8650-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 9-Pin Header	1	5V	RED
		2	LED1-R	RED VIO
		3	LED1-G	GRN VIO
		4	LED1-B	BLU VIO
		5	LED2	ORG
		6	LED3	ORG BLK
		7	LED4-R	RED YEL
		8	LED4-G	GRN YEL
		9	LED4-B	BLU YEL

4.15 TROUGH SERIAL OPTO TRANSMITTER

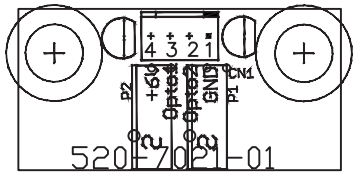
520-5344-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 3-Pin Header	1	Ground	BLK
		2	N/C	-
		3	+5 VDC IN	RED

4.16 DUAL OPTO ENCODER PCB

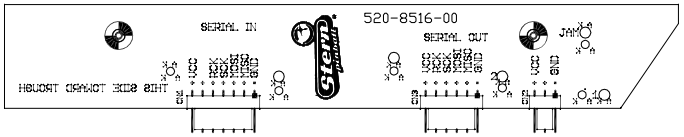
520-7021-01



ID	Type	Pin	Description	Wire Color
CN1	.100" 4-Pin Header	1	GND	BLK WHT
		2	Opto2 - Home	WHT
		3	Opto1 - Away	WHT GRY
		4	+6V	RED WHT

4.17 TROUGH SERIAL OPTO RECEIVER 8A

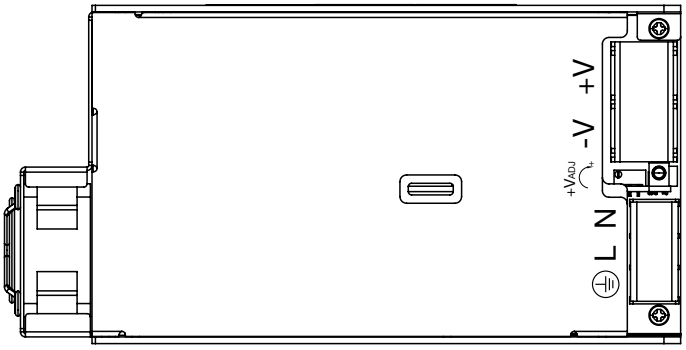
520-8516-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	N/C	-
		7	+5 VDC IN	RED
CN2	.100" 3-Pin Header	1	Ground	BLK
		2	N/C	-
		3	+5 VDC IN	RED
CN3	.100" 6-Pin Header	1	Ground	-
		2	MISO Output Data	-
		3	MOSI Input Data	-
		4	SCK Serial Clock	-
		5	RCK Register Clock	-
		6	V+	-

4.18 MAIN POWER SUPPLY

011-5011-00



ID	Type	Pin	Description	Wire Color
CN1	Screw Terminal	+V	+48 V System Power	GRY
		-V	DC Ground	BLK
CN2	Potentiometer	+V ADJ	V Adjustment	N/A
CN3	Screw Terminal	N	AC Line Hot In	BLK
		L	AC Line Neutral In	WHT
		⏚	Earth Ground In	GRN

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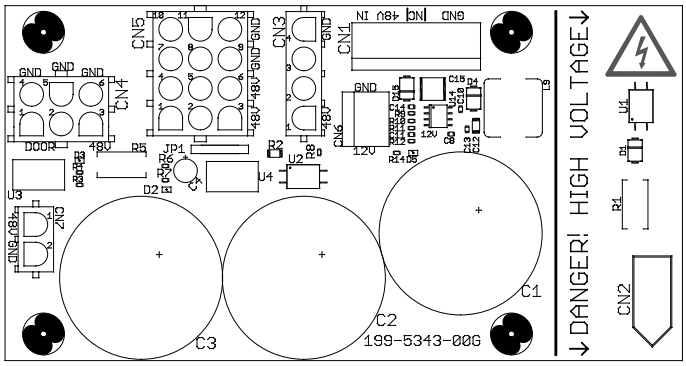
4.19 POWER DISTRIBUTION BOARD

520-8096-00



ID	Type	Pin	Description	Wire Color
CN1	.156 in 7-Pin Housing Plug: 045-5259-07 Pin: 055-5331-00 Key: 060-5013-00	1	+48 VDC IN	GRY
		2	+48 VDC IN	GRY
		3	+48 VDC IN	GRY
		4	Key (n/c)	-
		5	Ground	BLK
		6	Ground	BLK
		7	Ground	BLK
CN2	.093 in 3-Pos Plug Plug: 045-5003-03 Pin: 055-5013-09	1	Line In (100-240 VAC)	BLK
		2	Neutral	WHT
		3	Earth Ground	GRN
CN3	0.084 in 4-Pos Plug Plug: 045-5200-04 Pin: 055-5033-08	1	+48 VDC to CPU Node	GRY
		2	Door Interlock Switch Status	GRY/RED
		3	Line Voltage Status	VIO
		4	Ground	BLK
CN4	0.084 in 6-Pos Plug Plug: 045-5200-06 Pin: 055-5033-08	1	Door Interlock Switch +48V	GRY
		2	Door Interlock Switch +48V	-
		3	Switched 48V Out (to Node 1)	GRY/YEL
		4	Door Interlock Return Ground	GRY/RED
		5	Door Interlock Return Ground	-
		6	Ground (to Node 1)	BLK
CN5	0.084 in 12-Pos Plug Plug: 045-5200-12 Pin: 055-5033-08	1	Switched 48V Node Power	GRY
		2	Switched 48V Node Power	GRY
		3	Switched 48V Node Power	GRY
		4	Switched 48V Node Power	GRY
		5	Switched 48V Node Power	GRY
		6	Switched 48V Node Power	GRY
		7	Node Ground	BLK
		8	Node Ground	BLK
		9	Node Ground	BLK
		10	Node Ground	BLK
		11	Node Ground	BLK
		12	Node Ground	BLK
CN6	.156 in 3-Pos Plug: 045-5259-03 Pin:055-5331-00 (18awg)	1	Ground	-
		2	Ground	-
		3	+12VDC	-
CN7	.084 2-Pos Plug: 045-5200-02 Pin:055-5033-08	1	+48 VDC to Topper Node	GRY
		2	Ground	BLK

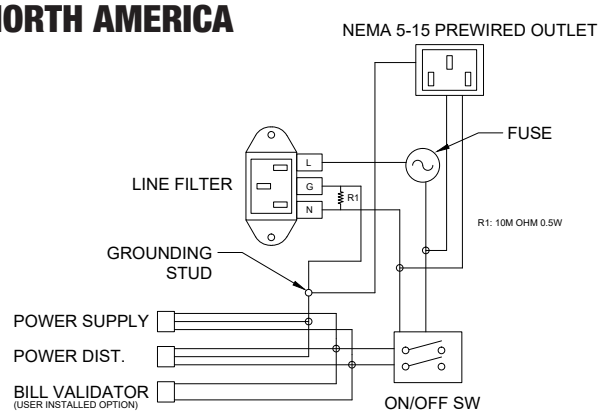
4.20 POWER PLUG WIRING

CAUTION

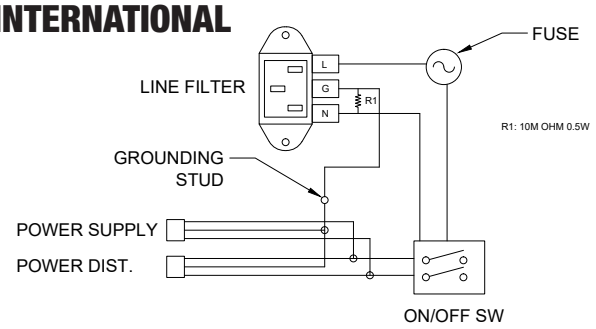
TO MAINTAIN SAFETY, GROUND WIRE FROM LINE FILTER IS TO BE MOUNTED FIRST ON GROUNDING STUD AND SECURED WITH NUT. ALL OTHER GROUNDS MAY THEN BE ATTACHED TO GROUNDING STUD.

REPLACE ALL FUSES WITH CORRECT CURRENT RATINGS!

NORTH AMERICA



INTERNATIONAL



LINE CORDS

Part Number	Description
034-6012-00	Line Cord, 3m, 5-15P USA
034-6012-01	Line Cord, 3m, CEE77P EUROPE
034-6012-02	Line Cord, 3m, BS1363P United Kingdom
034-6012-03	Line Cord, 3m, AS-NZS4417P Australia
034-6012-04	Line Cord, 3m, CEI23-16P Italy
034-6012-05	Line Cord, 3m, SEV1011P Switzerland
034-6012-06	Line Cord, 3m, JIS8303P Japan
034-6012-07	Line Cord, 3m, SI32P Israel
034-6012-08	Line Cord, 3m, BS546P S Africa, India
034-6012-09	Line Cord, 3m, IS6538P S. India

LINE FUSES

Line Voltage (Region)	Fuse Current	Type	Part Number
120V (North America)	8 A	Slow Blow 30G	200-5000-05
220/240v (Europe, Australia, UK)	5 A	Slow Blow 5 x 20mm	200-5003-00

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5. PARTS REFERENCE

5.1 PLAYFIELD RUBBER PARTS

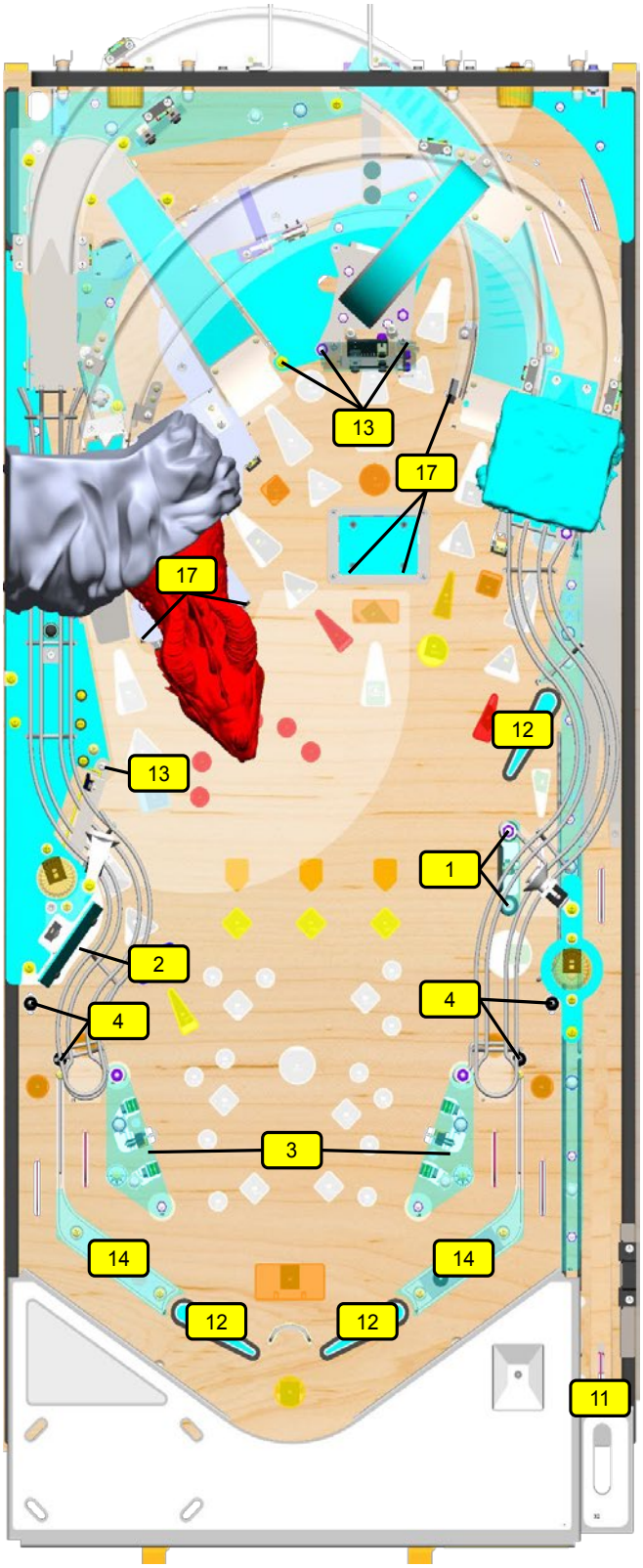

Figure 5.1.1. Rubber o-ring part locations

RUBBER O-RINGS

ID	Qty	Size (ID)	Size (OD)	Durometer	Color	Part Number
1	2	3/16"		50	Black	545-5348-01
2	1	3/4"		50	Black	545-5348-04
3	2	2-1/2"		50	Black	545-5348-09
4	4		7/16"	50	Black	545-5348-17

Figure 5.1.2. Rubber o-ring part numbers and usage. ID: Inner Diameter, OD: Outer Diameter, Durometer: Higher number is firmer, less bounce, and more durable.

ID	Qty	Description	Color	Part Number
11	1	Plunger Tip	Black	545-5276-00
12	3	Flipper Rubber	Black	545-5277-00
13	4	Post Sleeve	Black	545-5308-00
14	2	Post Rubber 1/2"	Black	545-5151-00
15	8	Bumper Pad (Sub assemblies)	Black	545-5105-00
16	4	Bumper Pad (Flippers)	Black	545-5428-00
17	5	Bumper Pad	Black	626-5057-01
18	4	Viton Rubber Rings (Sub Assemblies)	Black	545-6401-00

Figure 5.1.3. Other rubber part numbers and usage

5.2 RUBBER SIZE CHART

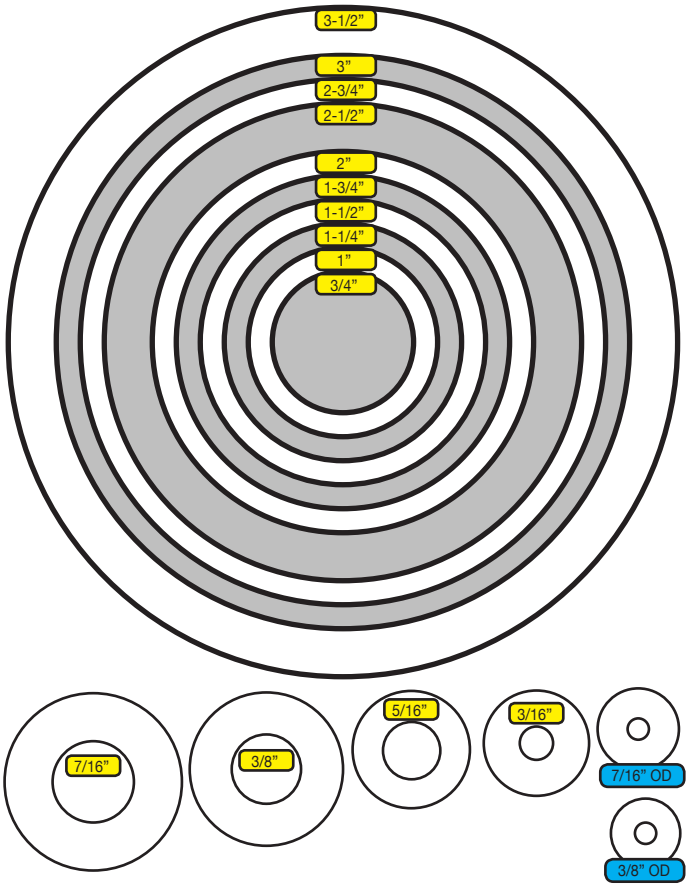

Figure 5.2.1. Rubber ring inner diameter sizing tool. Hold ring up to chart and read largest size on inside of ring. Dimensions are Inner Diameter (ID) unless otherwise noted as Outer Diameter (OD).

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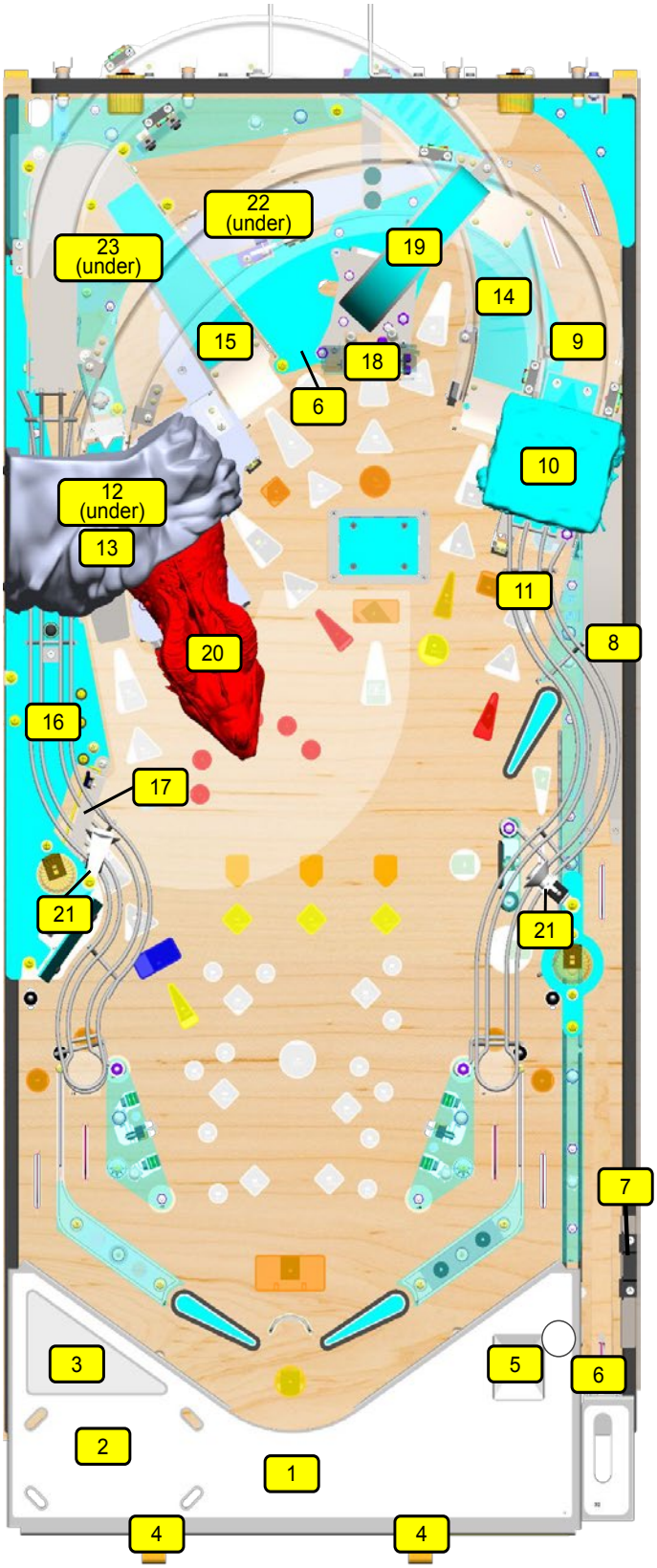
5.3 PLAYFIELD ASSEMBLIES, TOP



ID	Part Number	Description	Qty
1	510-7805-00	Bottom Arch Assembly	1
2	755-51X8-XX	Instructions Card	1
3	755-7669-00	SPI Card	1
4	535-8385-00	Welded Hanger Bracket	1
5	509-2020-00	QR Reader	1
6	260-5000-00	Pinballs	9
7	500-6815-00	Bubble Level Assembly	1
8	535-4077-00	Shooter Lane Ramp	1
9	511-5471-00	Cube Ramp Assembly	1
-	237-5902-00P	Screw, 8-32 x 3/8" PFH MS, Zinc, Patch	2
10	500-9956-00	Cube Assembly	1
-	240-5102-00	8-32 Nylon Lock Nut (2 under playfield)	3
-	242-5005-00	#8 Washer (both under playfield with nuts)	2
11	515-7861-00	Right Wireform Ramp	1
12	511-5470-00	Up / Down Ramp Assembly	1
-	530-9015-00	Grooved Clevis Pin, 3/16" x 3/8" (attaches to coil assy)	1
-	270-5001-00	Retaining E-Ring, 3/16" Shaft OD (attaches to coil assy)	1
-	237-5902-00P	Screw, 8-32 x 3/8" PFH MS, Zinc, Patch (attaches to cube ramp)	1
13	545-6380-00	Cave	1
14	500-2701-00	Right Ramp Assembly	1
-	237-6378-00P	Screw, 6-32 X 3/8" Pan Ohillips w/ double sems, patch	1
15	511-5367-00	Left Ramp Assembly	1
16	515-7836-00	Left Wireform Ramp	1
17	511-0030-00	Double One Way Gate Assembly (By Bottom Left VUK)	1
18	511-5439-00	Spinner Assembly With Plastic	1
19	511-8966-00	Eject Tube	1
-	240-5005-00	6-32 Nylon Stop Nut	3
-	232-5201-00P	Screw, 6-32 X 3/8" PPH W/ DS (attaches to right ramp)	1
20	511-1185-02	Dragon Jaw Assembly	1
21	545-5409-01	Light Reflector	2
-	535-1324-01	LED Spotlamp Retainer Clip	2
22	500-9936-01	Switch Gate Assembly	1
23	511-5441-00	Diverter Gate Assembly	1
-	242-5633-00	Washer, 5/16" SAE	1

Figure 5.3.1. Major playfield assemblies, Top locations.

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5.4 PLAYFIELD ASSEMBLIES, BOTTOM

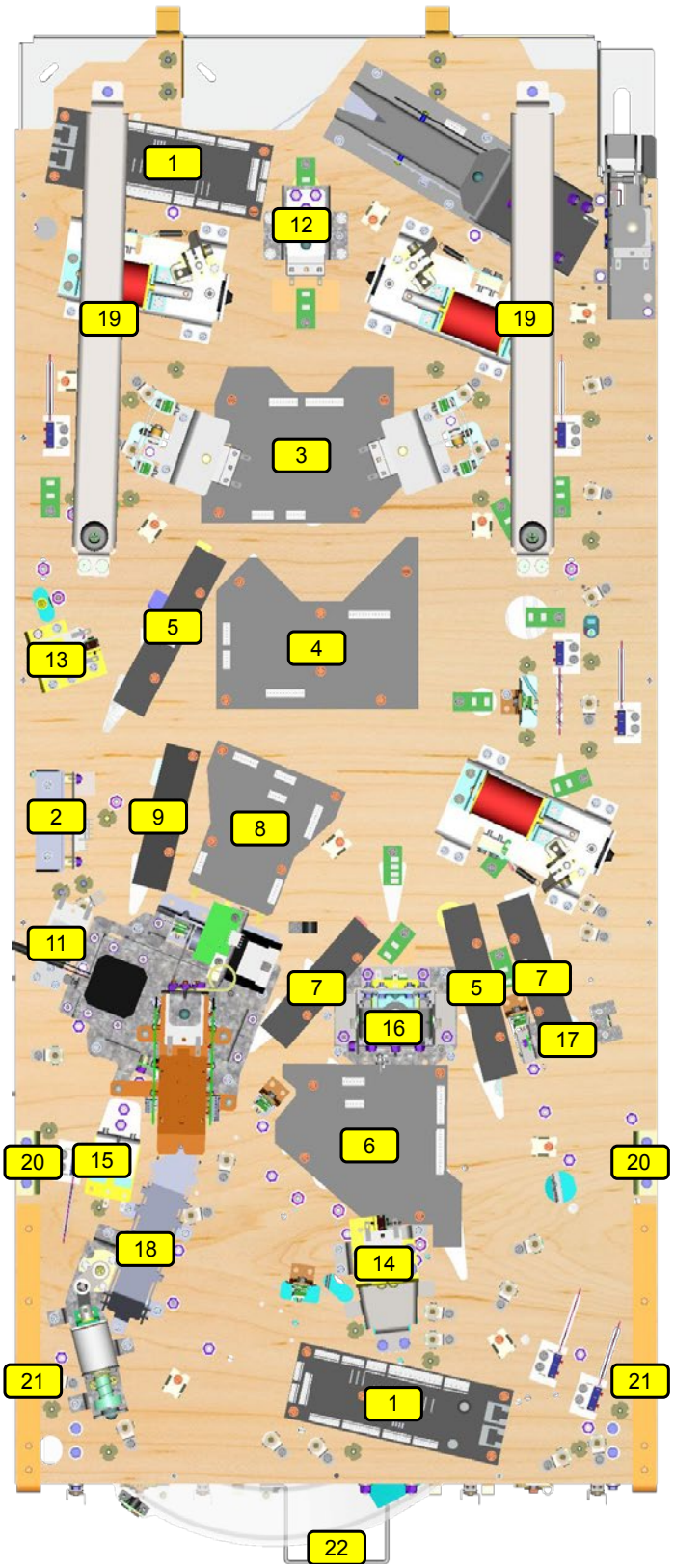

Figure 5.4.1. Major playfield assemblies, Bottom locations.

ID	Part Number	Description	Qty
1	520-1070-00 520-1057-00	Core Node Driver Board	2
2	520-5379-22	Stepper Motor Node Board	1
3	520-8680-00	LED Board 8b	1
4	520-8646-00	LED Board 8c	1
5	520-8650-00	LED Board 8c1, 9b2	2
6	520-8644-00	LED Board 9a	1
7	520-8649-00	LED Board 9a1, 9a2	2
8	520-8681-00	LED Board 9b	1
9	520-8682-00	LED Board 9b1	1
10	500-2955-00	Diverter Actuator Assembly	1
-	242-5015-00	#8 Washer (attaches to diverter gate)	1
-	232-5301-00P	Screw, 8-32 X 3/8" PPH SMES, PATCH (attaches to diverter gate)	1
11	500-2950-00	Up Post (Dragon Cave)	1
12	500-2951-00	Up Post (Shield)	1
13	500-7078-01	VUK (Bottom Left)	1
14	500-7427-00	VUK w/ Spacer (Top Center)	1
15	511-1186-00	Up / Down Ramp Coil Assembly	1
16	500-2948-00	Dungeon Up / Down Assembly	1
17	511-9773-00	Cube Opto Set Assembly	1
18	515-6800-00	Dragon Subway	1
19	511-7621-00	Support Rail Assembly	2
20	500-5329-03	Pivot Bracket Assembly	2
21	535-5988-01	Edge Slide Bracket	2
22	535-2288-00	Backpanel Handle	1

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5.5 BACKBOX PARTS

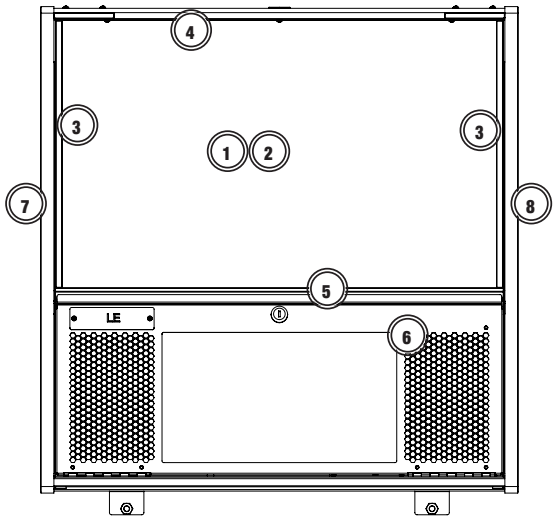


Figure 5.5.1. Backbox external assemblies and components

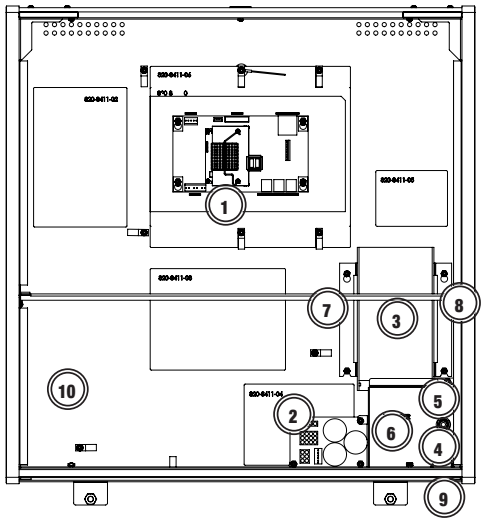


Figure 5.5.2. Backbox internal assemblies and components

EXTERNAL

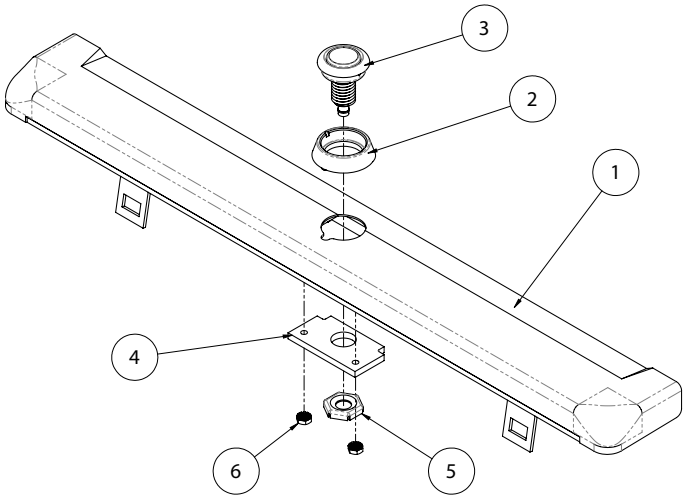
ID	Part Number	Description	Qty
1	660-5052-00	Backglass	1
2	830-8426-X8	Mirror Backglass [LE]	1
	830-8427-X9	Translite Art [Premium]	1
3	545-5018-17	Plastic Extrusion 15-.450"	2
4	545-5018-15	Glass Channel 26"	1
5	545-6313-01	Glass Lift Channel 26"	1
6	500-9996-00	LCD Speaker Panel Assembly	1
7	820-90X8-01	Left Backbox Decal [LE]	1
	820-76X9-01	Left Backbox Decal [Premium]	1
8	820-90X8-02	Right Backbox Decal [LE]	1
	820-76X9-02	Right Backbox Decal [Premium]	1
9	515-9866-00	Backbox Bottom Bracket [Not Labeled]	1

INTERNAL

ID	Part Number	Description	Qty
1	509-1003-01	CPU Node Board	1
2	520-8096-00	Power Distribution Board	1
3	011-5004-00	Power Supply 48V/600W	1
4	205-5001-00	Fuse Holder - Screw In	1
	200-5000-05	8A SB Fuse	1
5	515-9769-00	Utility Outlet (USA)	1
6	535-1162-00	Cover AC, 600W	1
7	535-0879-00	Power Supply Bracket, 600W Left	1
8	535-1161-00	Power Supply Bracket, 600W Right	1
9	180-5001-03	Power Switch	1
10	520-5370-72	Speaker Lights Node Board [LE]	1

5.6 LOCKDOWN BAR ASSEMBLY W/ CENTER BUTTON

500-2440-70 [LE] & 500-2440-00 [PRE]



ID	Part Number	Description	Qty
1	500-2441-70	FRONT MOLD ASSEMBLY - CENTER BUTTON - ILLUSION COPPER [LE]	1
	500-2441-00	FRONT MOLD ASSEMBLY - CENTER BUTTON - WRINKLED BLACK [PREMIUM]	1
2	545-7292-10	SPACER, CENTER BUTTON	1
3	515-7791-00	CENTER BUTTON ASSEMBLY	1
4	545-7291-00	TOP BUTTON BAR	1
5	240-5003-01	PAL NUT	1
6	240-5104-00	8-32 KEPS NUT	2

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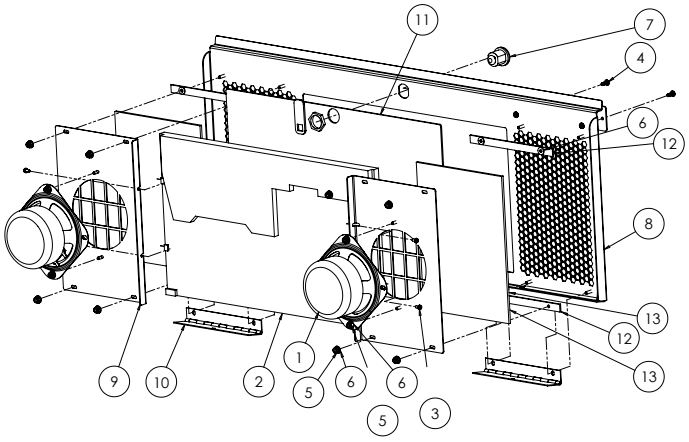
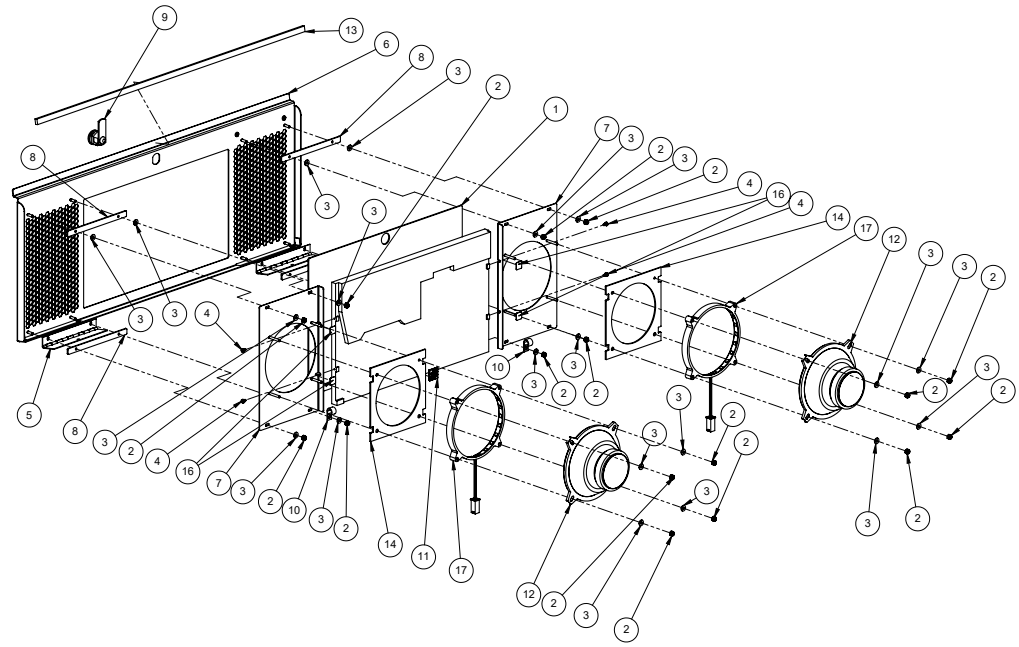
5.7 SPEAKER PANEL PARTS

PREMIUM : 500-9996-00



ID	Part Number	Description	Qty
1	031-5004-02	Speaker, 4" x 4" - 8 Ohm	2
2	116-0023-00	1366 x 768 Display LCD Panel	1
	037-1116-00	LCD LVDS Cable	1
	037-1115-00	LCD Back Light Cable [Innolux]	1
	037-1119-00	LCD Back Light Cable [Sharp]	1
3	237-6188-01	Screw, M3x0.5 X 6MM PPH Sems Zinc	4
4	237-6307-06	6-32 X 3/8" Torx Stainless Steel Screw	2
5	240-5005-00	6-32 Nylon Stop Nut	12
6	242-5001-00	#6 Washer	16
7	355-5168-00-00	Nut: Lock w/ Cam	1
8	515-9842-00	Speaker Panel - LCD	1
9	515-9843-00	Speaker Plate	2
10	515-9845-00	Hinge, Speaker Panel, LCD	2
11	545-9877-00	LCD Window	1
12	545-9877-01	Spacer, Small - LCD Speaker Panel	4
13	626-5109-00	Speaker Foam - LCD Panel	2

LE : 500-2442-X8



ID	Part Number	Description	Qty
1	545-9877-00	LCD WINDOW	1
2	240-5005-00	6-32 NYLON STOP NUT	16
3	242-5001-00	#6 WASHER	20
4	237-6188-01P	SCREW, M3x0.5 X 6MM PPH SEMS ZINC PATCH	4
5	515-9845-00	HINGE, SPEAKER PANEL, LCD	2
6	515-9842-00	LCD SPEAKER BRACKET - BLACK MINI-TEX	1
7	515-1941-00	SPEAKER PLATE, 5.25" DRIVERS	2
8	545-9877-01	SPACER, SMALL - LCD SPEAKER PANEL	4
9	355-5168-00-00	LOCK ASSEMBLY, BLACK, 5/8"TL + 1.8"LG STRAIGHT CAM	1

ID	Part Number	Description	Qty
10	040-5016-00B	CABLE CLAMP 0.38 BLACK	2
11	040-5002-00	MOUNTING PAD	1
12	031-5017-00	SPEAKER, 35W 4OHM 5-1/4" KENWOOD	2
13	626-5001-00	FOAM RUBBER, 3/8" W X 3/16" THK	1
14	546-7713-00	SPEAKER RING, DUNGEONS & DRAGONS	2
15	116-0023-00	1366 x 768 DISPLAY LCD PANEL	1
	037-1116-00	LCD LVDS CABLE	1
	037-1115-00	LCD Back Light Cable [Innolux]	1
	037-1119-00	LCD Back Light Cable [Sharp]	1
16	820-1098-00	DECAL, LIGHT BLOCKER, SPEAKER PANEL	4
17	511-1135-00	ASM, SPEAKER LIGHT RING	2

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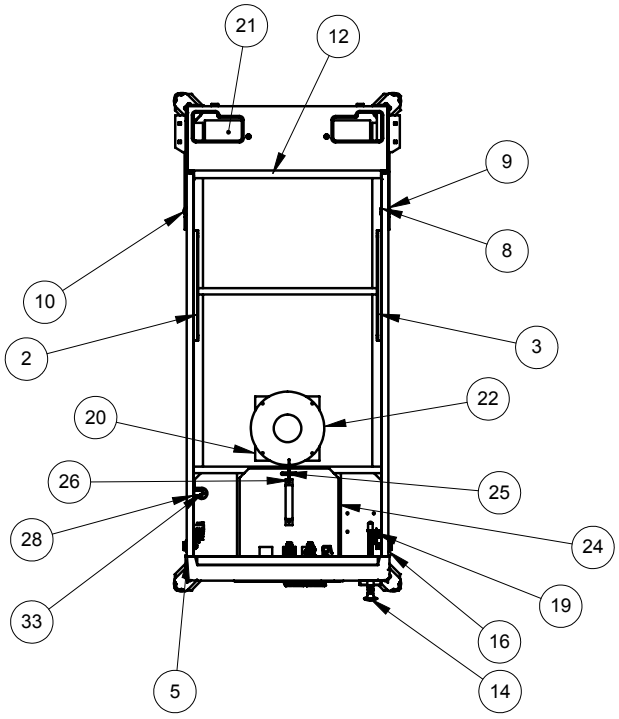
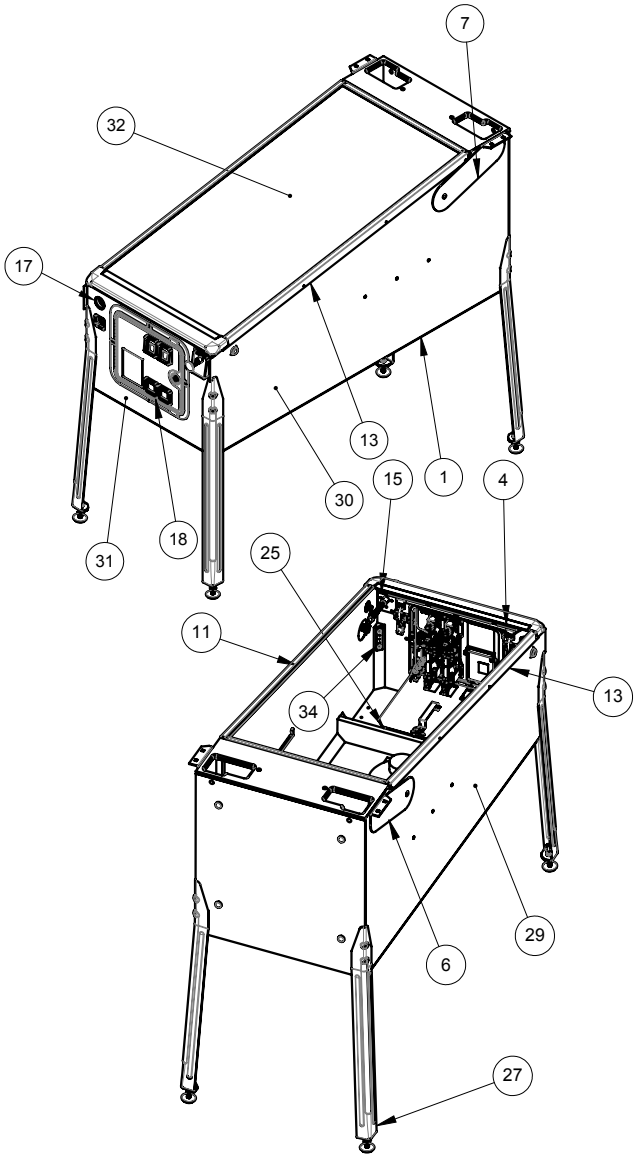
5.8 CABINET PARTS





ID	Part Number	Description	Qty
1	525-6026-01	Cabinet Assembly, Single Button	1
2	535-5989-00	Slide & Pivot Bracket - Left Side	1
3	535-5990-00	Slide & Pivot Bracket - Right Side	1
4	535-2051-00	Cabinet Playfield Support Bracket	1
5	500-2440-70	Front Molding Assembly - Illusion Copper [LE]	1
	500-2440-00	Front Molding Assembly - Wrinkle Black [Premium]	1
6	535-7999-70L	Pivot Hinge, Left - Illusion Copper [LE]	1
	535-7999-00	Pivot Hinge, Left - Wrinkle Black [Premium]	1
7	535-7999-70R	Pivot Hinge, Right - Illusion Copper [LE]	1
	535-7999-01	Pivot Hinge, Right - Wrinkle Black [Premium]	1
8	254-5042-00	Spacer Nut, Hex, 1/2"OD, 1/4-20	2
9	242-5084-00	Washer, 1/2" I.D., 3/16" THK	2
10	231-5072-00	1/4-20 X 1/2" Carriage Bolt	2
11	545-5017-00	Plastic Channel	2
12	545-5038-00	Glass Rear Extrusion	1
13	535-3323-70L	Side Armor Assembly Left - Illusion Copper [LE]	1
	535-3323-70R	Side Armor Assembly Right - Illusion Copper [LE]	1
	535-0902-01-00	Side Armor Left - Wrinkle Black [Premium]	1
	535-0902-02-00	Side Armor Right - Wrinkle Black [Premium]	1
14	500-2604-07	Ball Shooter Assembly - Orange Spring	1
15	535-5027-01	Plunger Support Plate, Notched	1
16	500-1169-00	Flipper Button Assy - Black [LE]	2
	500-1169-32	Flipper Button Assy - Red [Premium]	2
17	500-1060-44-LED	Start Button	1
18	501-5018-173	Coin Door 2-Chute No Emboss	1
19	180-5160-01	Flipper Switch, Single (Left)	1
	180-5164-01	Flipper Switch, Double (Right)	1
20	545-5072-03	Grill - Speaker / Vent	1
21	545-5072-02	Grill - Speaker / Vent	1
22	031-5016-00	Woofer, 8" Round, 4Ω [LE]	1
	031-5007-01	Speaker, Cabinet 8" Round, 4 Ohm [Premium]	1
23	545-5090-00	Cash Box - Plastic	1
24	535-5013-03	Cash Box Cover	1

ID	Part Number	Description	Qty
25	535-7562-00	Cash Box Lock Bracket Wire	1
26	535-7772-00	Hair Pin Clip	1
27	500-5921-70	Leg Assembly - Illusion Copper [LE]	4
	500-5921-50	Leg Assembly - Wrinkle Black [Premium]	4
28	516-0007-00	Tilt Assembly	1
	535-5029-00	Tilt Plumb Bob	1
29	820-90X8-03	Decal, Cabinet Left, Dungeons & Dragons LE	1
	820-76X9-03	Decal, Cabinet Left, Dungeons & Dragons Premium	1
30	820-90X8-04	Decal, Cabinet Right, Dungeons & Dragons LE	1
	820-76X9-04	Decal, Cabinet Right, Dungeons & Dragons Premium	1
31	820-90X8-05	Decal, Cabinet Front, Dungeons & Dragons LE	1
	820-76X9-05	Decal, Cabinet Front, Dungeons & Dragons Premium	1
32	660-5053-00	High Resolution Glass [LE]	1
	660-5001-00	Playfield Glass [Premium]	1
33	520-6967-72	Cabinet Node Board	1
34	535-2049-00	Corner Brackets For Cabinet Legs	4
	234-5102-00	Screw, 8 X 5/8" SLT HWH AB Zinc	24
35	820-8429-X8R	Interior Cabinet Decal, Right, Dungeons & Dragons LE	1
	820-8429-X8L	Interior Cabinet Decal, Left, Dungeons & Dragons LE	1
	820-90X8-XX 820-76X9-XX	Cabinet Decal Replacement Set, Speaker Panel Decal Not Included	

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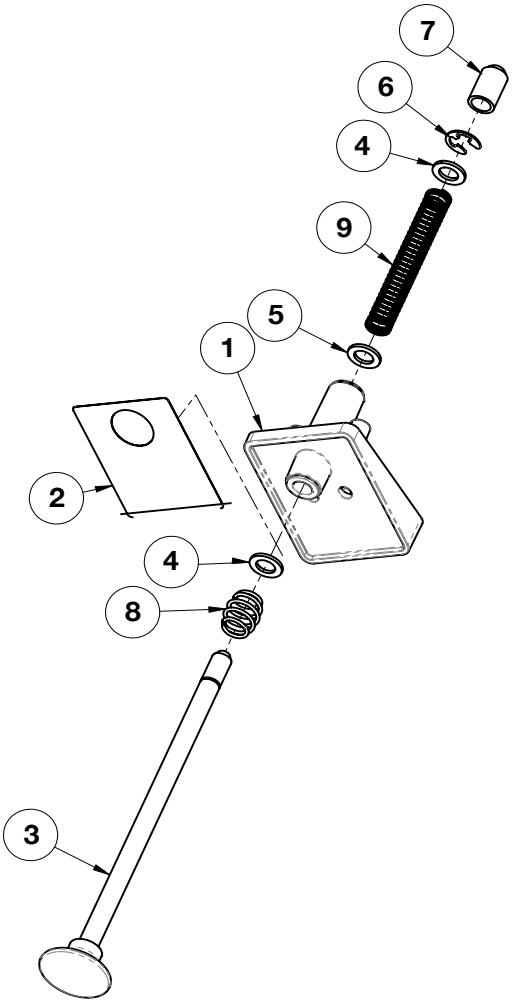
5.9 BALL SHOOTER ASSEMBLY

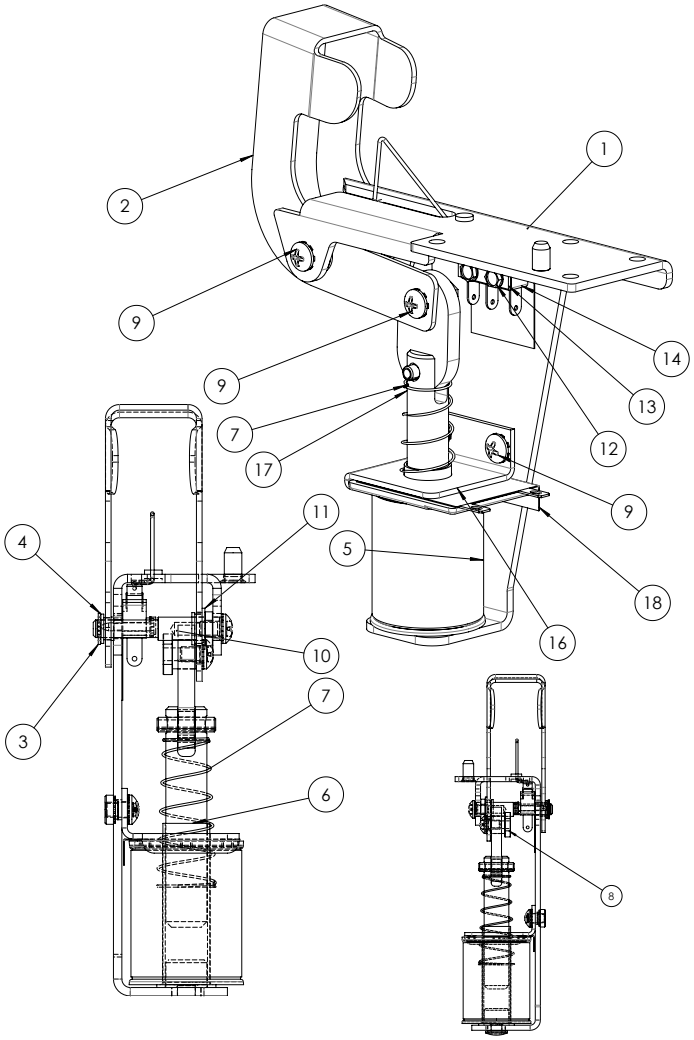
500-2604-07



ID	Part Number	Description	Qty
1	515-2436-01	HOUSING ASSEMBLY	1
2	820-1408-00	DECAL - SHOOTER HOUSING SPI	1
3	515-6557-00	ROD ASSEMBLY	1
4	242-5014-00	WASHER 3/8 ID X 5/8 OD X 1/16"	2
5	242-5637-00	NYLON WASHER 3/8 ID X 5/8 OD X 1/16"	1
6	270-5012-00	RETAINING RING, 3/8"	1
7	545-5276-00	RUBBER TIP	1
8	266-5010-00	COMPRESSED SPRING (SHORT)	1
9	266-5001-07	COMPRESSED SPRING (LONG) - ORANGE	1

5.10 AUTO LAUNCH ASSEMBLY

500-9818-02



ID	Part Number	Description	Qty
1	515-9689-01	MAIN BRKT: AUTO-PLUNGER	1
2	535-0728-00	KICKER ARM, AUTO-PLUNGER	1
3	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
4	545-5352-00	NYLINER, 3/16" SHAFT	1
5	090-5001-ND	COIL - 23-800, NO DIODE	1
6	545-5411-00	COIL SLEEVE	1
7	266-5020-00	COMPRESSION SPRING-CONICAL	1
8	530-7834-00	PIN: KICKER ARM, AUTO-PLUNGER	1
9	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	4
10	530-7835-00	PIVOT, AUTO-PLUNGER	1
11	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF	1
12	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
13	535-6539-00	SWITCH BODY PROTECT PLATE	1
14	180-5157-01	SHOOTER SWITCH - SHORT ARM	1
15	545-6268-00	FISCHE PAPER	1
16	535-0762-00	COIL BRACKET-AUTOPLUNGER	1
17	515-6304-03	PLUNGER / LINK ASSEMBLY	1
18	545-0762-00	FISCHE PAPER: AUTO-LAUNCHER	1

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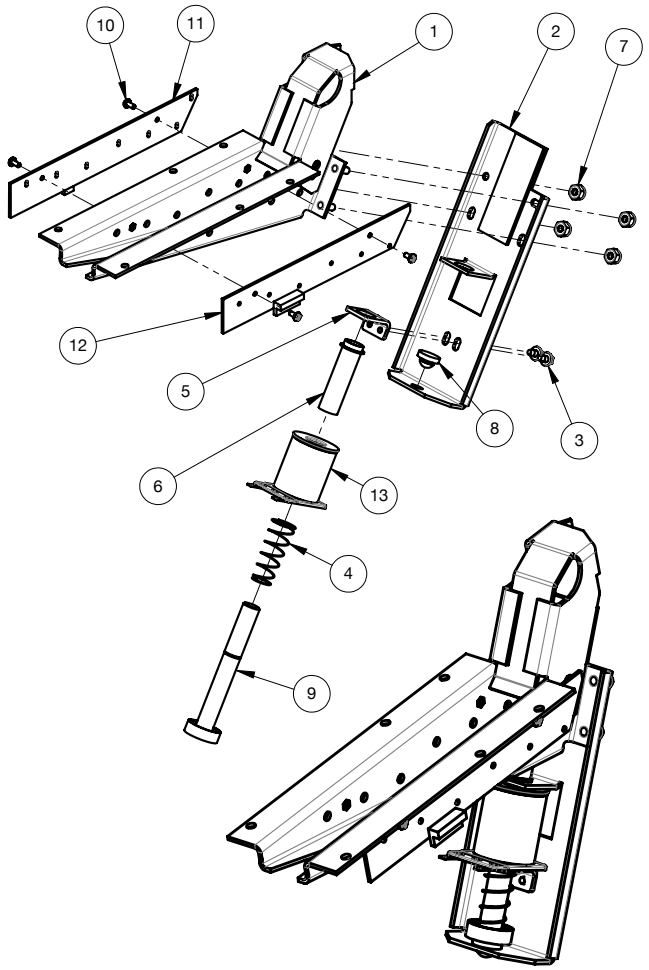
5.11 BALL TROUGH ASSEMBLY

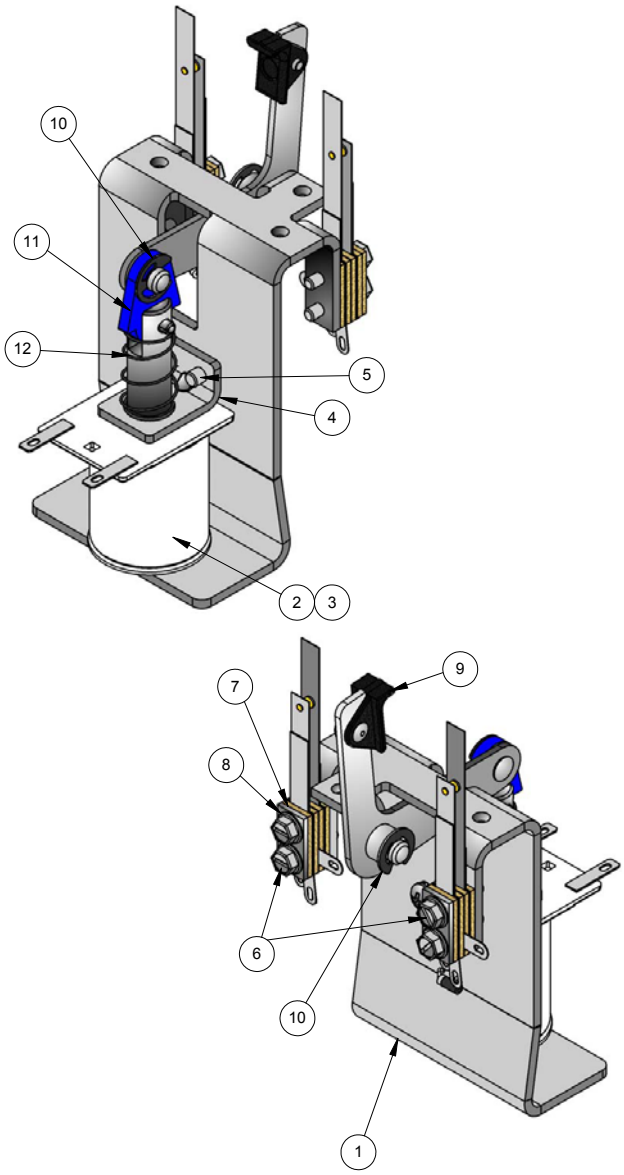
500-9820-01



ID	Part Number	Description	Qty
1	515-7811-00	MAIN BRKT. BALL TROUGH	1
2	515-7812-00	COIL BRACKET, BALL TROUGH	1
3	237-5975-04	SCREW, 8-32 X 1/4" HWH SWAGE SERR	2
4	266-5020-00	COMPRESSION SPRING-CONICAL	1
5	535-5203-03	COIL RETAINING BRACKET	1
6	545-5076-01	COIL SLEEVE	1
7	240-5102-00	8-32 NYLON LOCK NUT	4
8	545-5105-00	RUBBER BUMPER	1
9	515-7309-01	PLUNGER ASSEMBLY	1
10	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	4
11	520-5344-00	TROUGH BOARD #1 - ILED TRANSMITTER	1
12	520-8516-00	TROUGH BOARD #2 - RECEIVER	1
13	090-5004-ND	COIL 27-1500 - NO DIODE	1
98*	605-5006-00	SHRINK TUBING 1/8"	.42 FT.
99*	036-5611-11-F5	CABLE TROUGH OPTOS	1

5.12 SLINGSHOT ASSEMBLY

500-9920-01



ID	Part Number	Description	Qty
1	515-5339-01	SLINGSHOT BRACKET ASSEMBLY	1
2	090-5044-ND	COIL 26-1200 - NO DIODE	1
3	545-5031-00	COIL SLEEVE	1
4	535-5203-03	COIL RETAINER BRACKET	1
5	232-5301-00	8-32 X 3/8 PPH MS EXT SEMS ZC	2
6	180-5231-00	SWITCH SLING SHOT 2 LUG CENTER	2
7	535-5045-00	SWITCH PLATE	2
8	237-5976-04	6-32 X 5/8 SLOT SER HWH SW	4
9	515-5340-01	ARM & TIP ASSEMBLY	1
10	270-5002-00	RETAINING RING - 1/4 DIA	2
11	515-5338-00	PLUNGER & LINK ASSEMBLY	1
12	266-5020-00	COMP SPRING CONICAL	1
13	036-5604-00	4" GENERIC JUMPER	2

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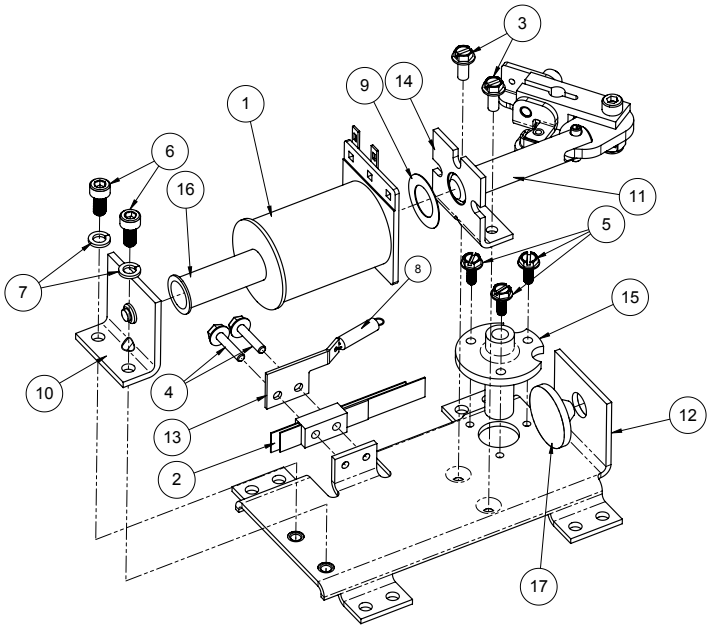
5.13 FLIPPER ASSEMBLY, LEFT

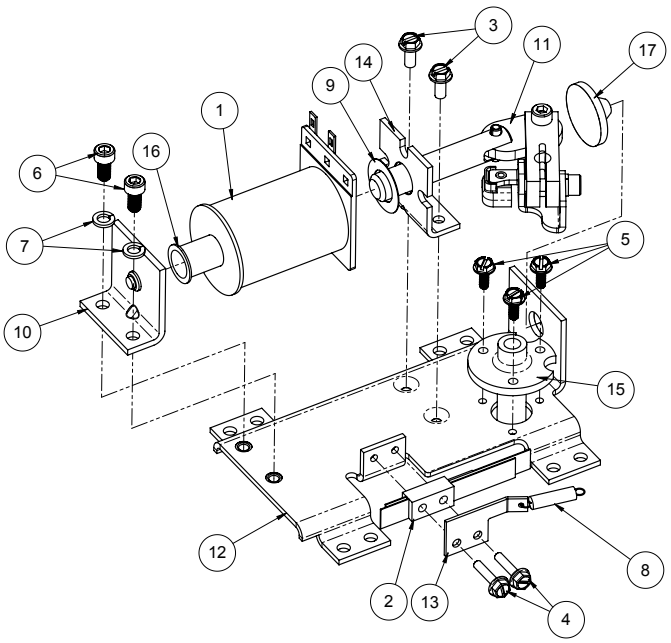
500-6543-12-ND



ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL	1
2	180-5149-00	SWITCH, END-OF-STROKE	1
3	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	2
4	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE	2
5	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
6	237-6389-00	SCREW, 10-32 X 3/8", SHC	2
7	244-5003-00	#10 LOCK WASHER, SPLIT	2
8	265-5035-00	EXTENSION SPRING	1
9	269-5002-00	SPRING WASHER	1
10	515-6308-01	COIL STOP ASSEMBLY	1
11	515-7203-01	PLUNGER / CRANK ASSEMBLY	1
12	535-7275-01	FLIPPER BASE PLATE, LEFT	1
13	535-7354-01	SWITCH PLATE / SPRING RTN BRKT	1
14	535-7356-00	COIL BRACKET	1
15	545-5070-00	FLIPPER BUSHING	1
16	545-5388-00	COIL SLEEVE	1
17	545-5428-00	RUBBER BUMPER	1
18	515-5133-08-06	FLIPPER BAT (WHITE) AND SHAFT	1
19	545-5277-00	FLIPPER RUBBER	1

5.14 FLIPPER ASSEMBLY, RIGHT & UPPER RIGHT

500-6543-02-ND



ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL	1
2	180-5149-00	SWITCH, END-OF-STROKE	1
3	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	2
4	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE	2
5	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
6	237-6389-00	SCREW, 10-32 X 3/8", SHC	2
7	244-5003-00	#10 LOCK WASHER, SPLIT	2
8	265-5035-00	EXTENSION SPRING	1
9	269-5002-00	SPRING WASHER	1
10	515-6308-01	COIL STOP ASSEMBLY	1
11	515-7203-00	PLUNGER / CRANK ASSEMBLY	1
12	535-7275-00	FLIPPER BASE PLATE, RIGHT	1
13	535-7354-00	SWITCH PLATE / SPRING RTN BRKT	1
14	535-7356-00	COIL BRACKET	1
15	545-5070-00	FLIPPER BUSHING	1
16	545-5388-00	COIL SLEEVE	1
17	545-5428-00	RUBBER BUMPER	1
18	515-5133-08-06	FLIPPER BAT (WHITE) AND SHAFT	1
19	545-5277-00	FLIPPER RUBBER	1

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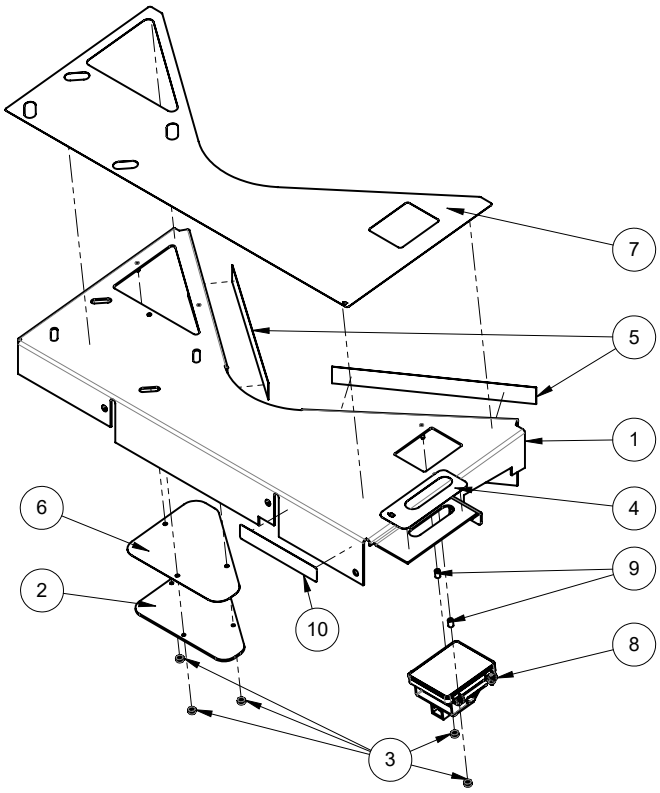
5.15 BOTTOM ARCH ASSEMBLY

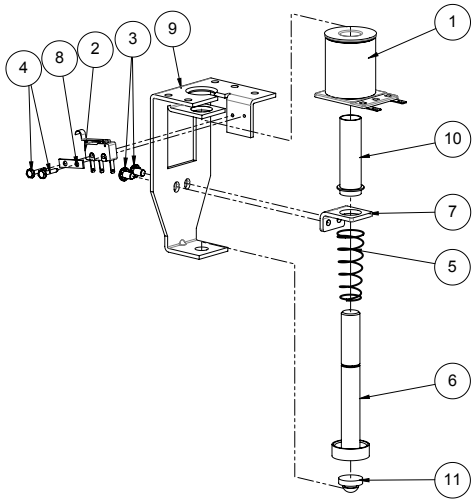
500-2505-XX



ID	Part Number	Description	Qty
1	510-7805-00	BOTTOM ARCH, STEEL W/ SPADE BOLT, QR READY	1
2	830-8502-XX	LEFT SIDE ARCH PLASTIC	1
3	240-5303-00	4-40 NYLON LOCK NUT	5
4	820-97XX-02	METAL ARCH DECAL SET -02	1
5	545-5212-04	MYLAR PROTECT STRIP 7-5/8"	2
6	545-9923-00	COVER, SIGNATURE PROTECTOR, METAL ARCH	1
7	820-97XX-01	METAL ARCH DECAL SET -01	1
8	509-2020-00	QR SCANNER M306 ASSEMBLY	1
9	254-5090-04	PLASTIC SPACER #4 SCREW, 3/16" OD - 9/32" LENGTH	2
10	820-5422-00	WARNING DECAL, BOTTOM ARCH, QR READER	1

5.16 VUK ASSEMBLY (BOTTOM LEFT)

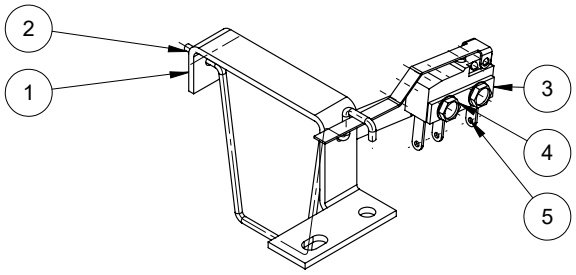
500-7078-01



ID	Part Number	Description	Qty
1	090-5001-ND	090-5001-ND	1
2	180-5209-00	SUB MINIATURE SWITCH - SIM. ROLLER	1
3	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
4	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
5	266-5020-00	COMPRESSION SPRING-CONICAL	1
6	515-7309-00	PLUNGER ASSEMBLY	1
7	535-5203-03	COIL RETAINING BRACKET	1
8	535-6539-00	SWITCH BODY PROTECT PLATE	1
9	535-9590-03	VUK BRACKET - R.H. - NO ACTUATOR	1
10	545-5076-01	COIL SLEEVE	1
11	545-5105-00	RUBBER BUMPER	1

5.17 SWITCH GATE ASSEMBLY

500-9936-01



ID	Part Number	Description	Qty
1	535-7756-01	BRACKET - GATE	1
2	535-7755-01	WIRE FORM	1
3	535-6539-00	SWITCH BODY PROTECT PLATE	1
4	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
5	180-5087-00	SWITCH GATE	1

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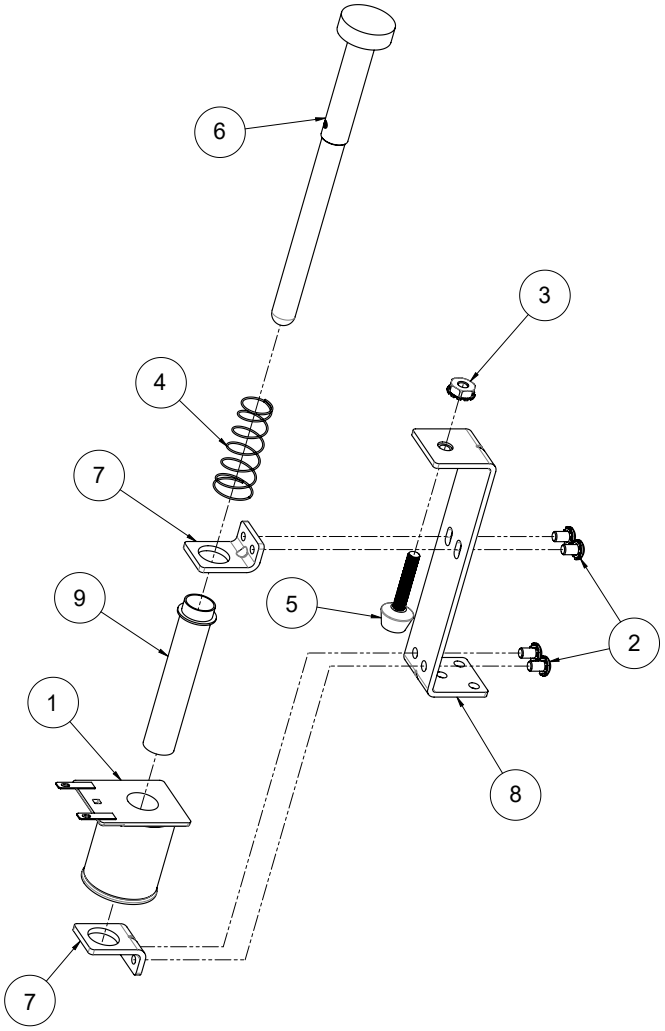
5.18 UP POST (DRAGON CAVE)

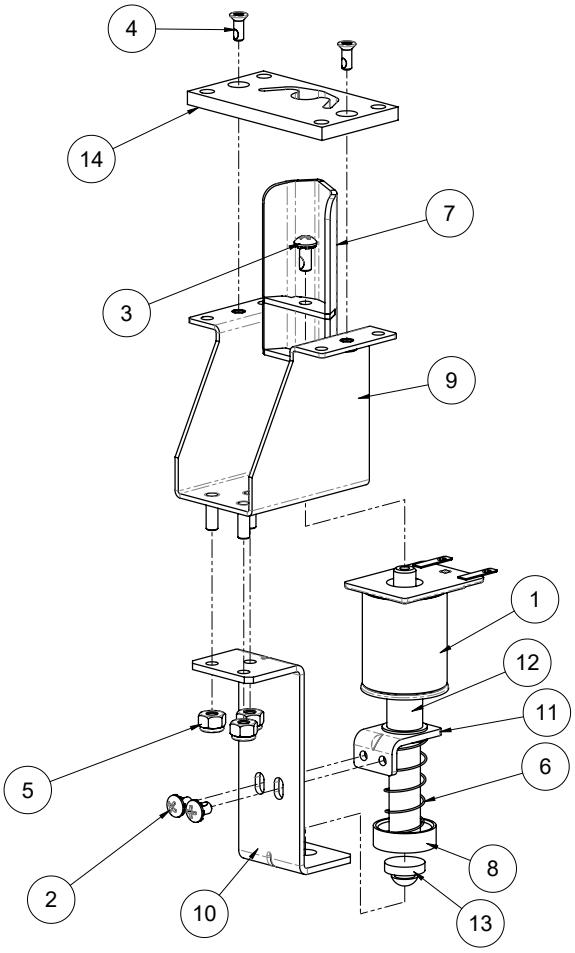
500-2950-00



ID	Part Number	Description	Qty
1	090-5044-ND	COIL 26-1200 COIL NO DIODE	1
2	232-5300-00P	SCREW, 8-32 X 1/4", ZC, SEMS, PPH, PATCH	4
3	240-5208-00	10-32 KEPS NUT	1
4	266-5020-00	COMPRESSION SPRING CONICAL	1
5	280-5014-00	ADJUSTABLE BUMPER STOP W/ RUBBER TIP	1
6	515-7871-00	ASSEMBLY PLUNGER UP POST, DUNGEONS & DRAGONS	1
7	535-5203-03	COIL RETAINING BRACKET	2
8	535-9248-00	BALL STOPPER Z - BRACKET	1
9	545-5847-00	COIL SLEEVE W/EXTENSION A 2.69 INCH	1

5.19 UP POST (SHIELD)

500-2951-00



ID	Part Number	Description	Qty
1	090-5044-ND	COIL 26-1200 COIL NO DIODE	1
2	232-5300-00P	SCREW SEMS, PPH, 8-32 X 1/4", ZC, PATCH	2
3	232-5301-00P	SCREW SEMS, PPH, 8-32 X 3/8", ZC, PATCH	1
4	237-5850-00P	SCREW 6-32 X 3/8" PFH ZINC PATCH	2
5	240-5102-00	8-32 NYL STP NUT	3
6	266-5020-00	COMPRESSION SPRING, CONICAL	1
7	515-7872-00	SHIELD WELDMENT, SHIELD UP POST, DUNGEONS & DRAGONS	1
8	515-7873-00	ASM PLUNGER, SHIELD UP POST, DUNGEONS & DRAGONS	1
9	535-5173-00	BRACKET, UP POST, DUNGEONS & DRAGONS	1
10	535-5179-00	COIL BRACKET, SHIELD UP POST, DUNGEONS & DRAGONS	1
11	535-5203-03	COIL RETAINING BRACKET	1
12	545-5076-01	COIL SLEEVE	1
13	545-5105-00	RUBBER BUMPER	1
14	546-5031-00	GUIDE PLATE, SHIELD UP POST, DUNGEONS & DRAGONS	1

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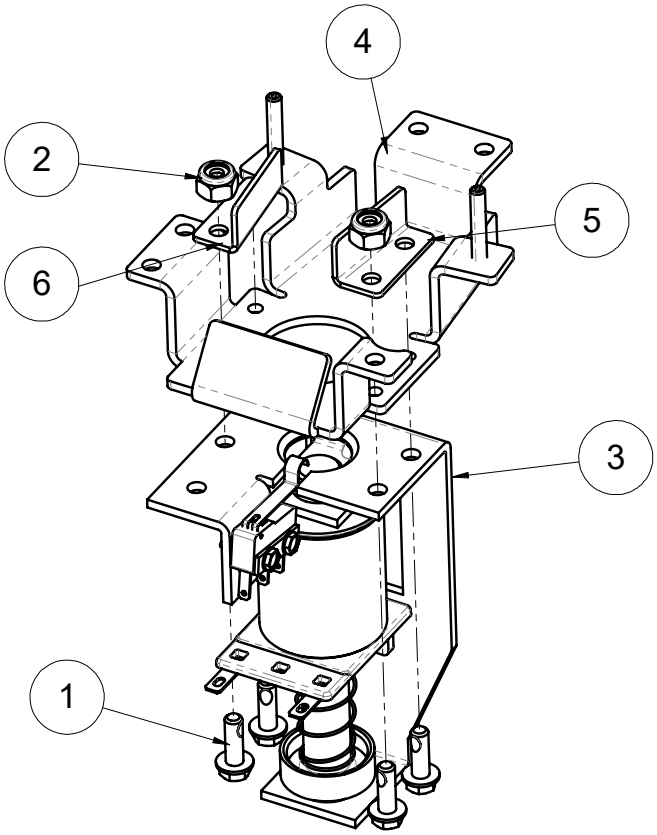
5.20 CENTER VUK WITH SPACER

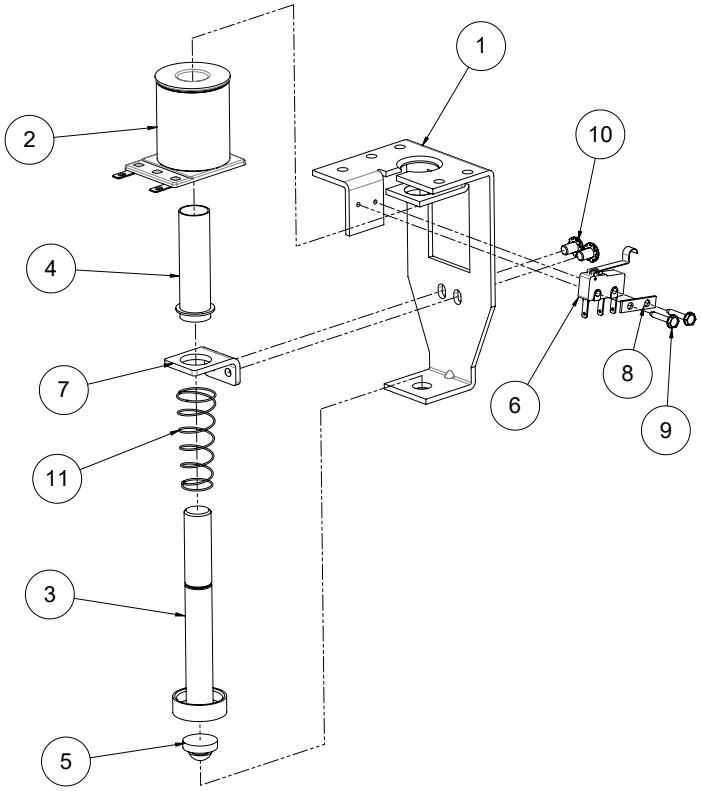
500-7427-00



ID	Part Number	Description	Qty
1	237-5903-00P	SCREW, 8-32 X 3/8" HWH, PATCH	4
2	240-5102-00	8-32 NYLON LOCK NUT	2
3	500-7078-00	VUK ASSY 23-800 LH W/O ACTR	1
4	535-5561-00	BRACKET, CENTER VUK, DUNGEONS & DRAGONS	1
5	535-9422-02	BAFFLE, VUK ASSEMBLY, RIGHT HAND	1
6	535-9422-01	BAFFLE, VUK ASSEMBLY, LEFTHAND	1

5.21 CENTER VUK

500-7078-00



ID	Part Number	Description	Qty
1	535-9590-02	VUK BRKT, LH, NO ACTUATOR	1
2	090-5001-ND	COIL, 23-800 NO DIODE	1
3	515-7309-00	PLUNGER ASSEMBLY	1
4	545-5076-01	COIL SLEEVE	1
5	545-5105-00	RUBBER BUMPER	1
6	180-5209-00	SUB MINIATURE SWITCH - SIM. ROLLER	1
7	535-5203-03	COIL RETAINER BRKTCOIL RETAINING BRACKET	1
8	535-6539-00	SWITCH BODY PROTECT PLATE	1
9	237-5937-02P	SCREW, 2-56 X 1/2" HWH MS	2
10	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS	2
11	266-5020-00	COMPRESSION SPRING, CONICAL	1

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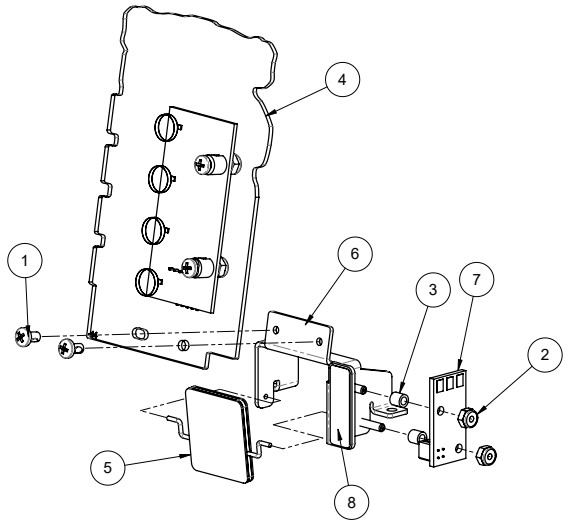
5.22 SPINNER ASSEMBLY

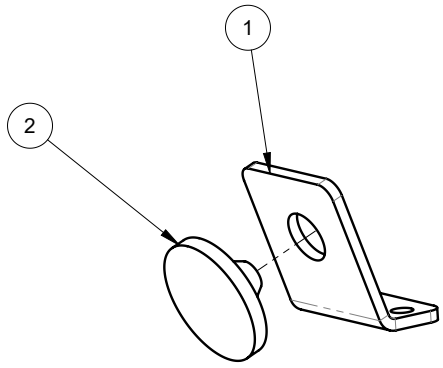
511-5439-00



ID	Part Number	Description	Qty
1	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	2
2	240-5303-00	4-40 NYLON LOCK NUT	2
3	254-5090-01	PLASTIC SPACER, 3/16" OD - 3/16" LENGTH	2
4	511-5393-14	PLASTIC -14 ASSEMBLY	1
5	515-2326-00	SPINNER TARGET, REFLECTIVE OPTO	1
6	515-7878-00	BRACKET, SPINNER	1
7	520-8541-00	PCA SPINNER REFLECTIVE OPTIC	1
8	820-7958-21	DECAL -21, SPINNER BRACKET	1

5.23 DEFLECTOR WITH RUBBER

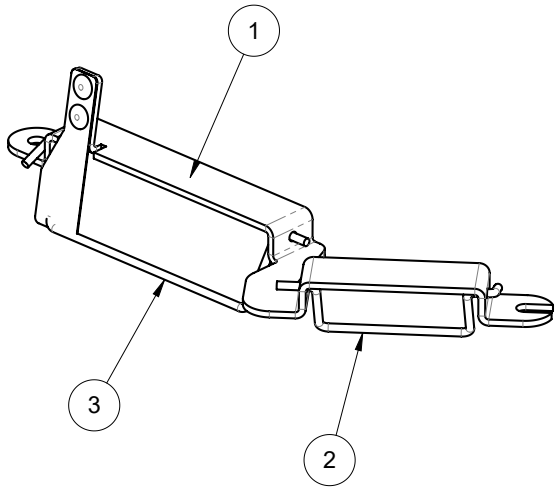
511-1137-00



ID	Part Number	Description	Qty
1	535-3072-00	BRACKET, DEFLECTOR	1
2	545-5428-00	RUBBER BUMPER	1

5.24 DOUBLE ONE WAY GATE

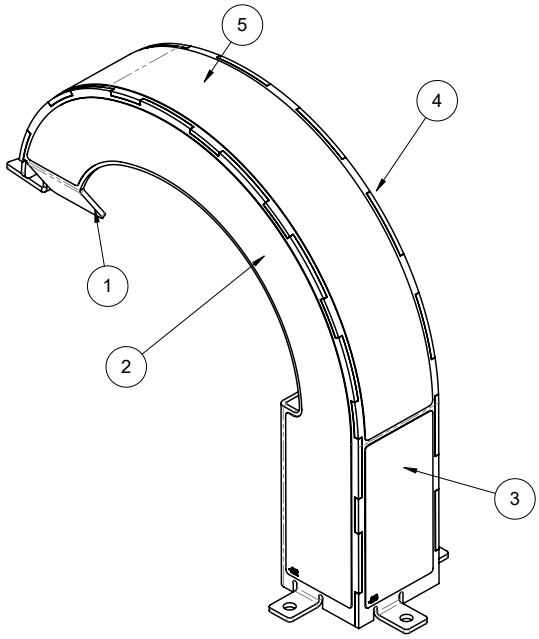
511-0030-00



ID	Part Number	Description	Qty
1	510-7977-00	RIVETED ASSEMBLY, O.W.G. BRACKET	1
2	535-5307-13	ONE-WAY WIRE GATE	1
3	535-5307-12	ONE-WAY WIRE GATE	1

5.25 EJECT TUBE DECAL LAYOUT

511-8966-00



ID	Part Number	Description	Qty
1	515-7880-00	EJECT TUBE	1
2	820-6399-22	DECAL #22, WEBSLINGER LEFT WALL	1
3	820-6399-23	DECAL #23, WEBSLINGER MID WALL	1
4	820-6399-24	DECAL #24, WEBSLINGER RIGHT WALL	1
5	820-6399-25	DECAL#25, WEBSLINGER	1

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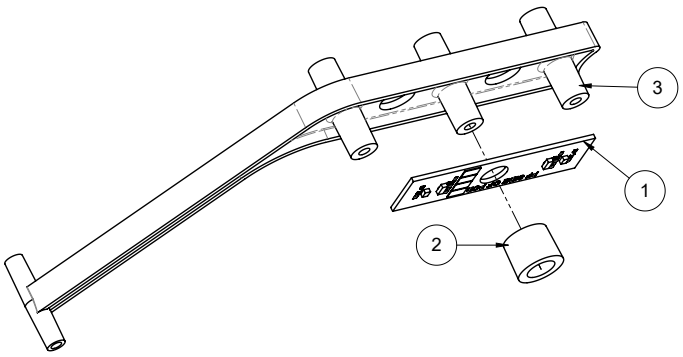
5.26 LEFT RETURN LANE ASSEMBLY

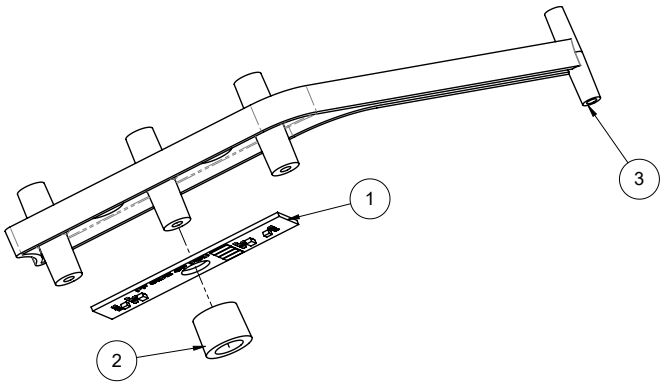
511-0038-00



ID	Part Number	Description	Qty
1	520-8652-00	LAMP BOARD, RETURN LANE	1
2	545-5151-00	RUBBER SLEEVE	1
3	550-5037-01	RETURN LANE GUIDE - LONG	1

5.27 RIGHT RETURN LANE ASSEMBLY

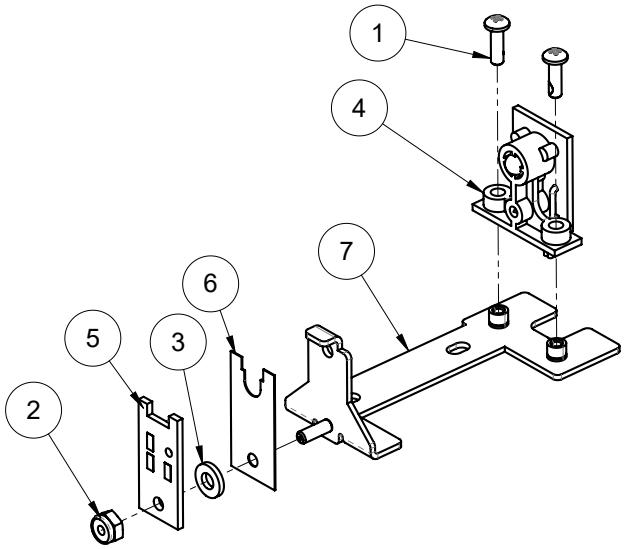
511-0038-01



ID	Part Number	Description	Qty
1	520-8652-00	LAMP BOARD, RETURN LANE	1
2	545-5151-00	RUBBER SLEEVE	1
3	550-5037-01	RETURN LANE GUIDE - LONG	1

5.28 CUBE OPTO SET

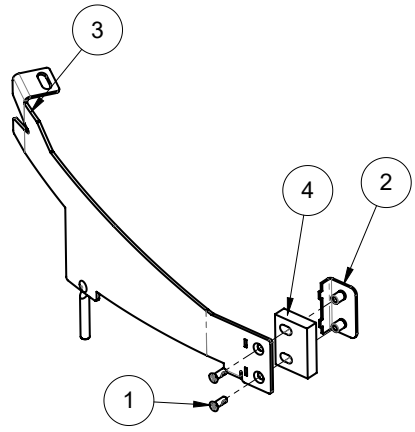
511-9773-00



ID	Part Number	Description	Qty
1	237-6379-00P	SCREW, 4-40 X 3/8", PPH MS, ZINC, PATCH	2
2	240-5303-00	4-40 NYLON LOCK NUT	1
3	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	1
4	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
5	511-5815-01	ASM OPTO RECEIVER W/CBL	1
6	523-0033-00	FISCHE PAPER, MINI OPTOS	1
7	535-3084-00	BRACKET, CUBE OPTOS	1

5.29 LEFT ORBIT INSIDE BALL GUIDE

511-9779-00



ID	Part Number	Description	Qty
1	237-6151-00P	SCREW, 4-40 X 5/16" PFH U/C MS	2
2	535-1355-00	RIGHT RAMP EDGE PROTECTOR	1
3	535-4124-00	LEFT ORBIT INSIDE BALL GUIDE, DUNGEONS & DRAGONS	1
4	626-5057-01	GUIDE BUMPER	1

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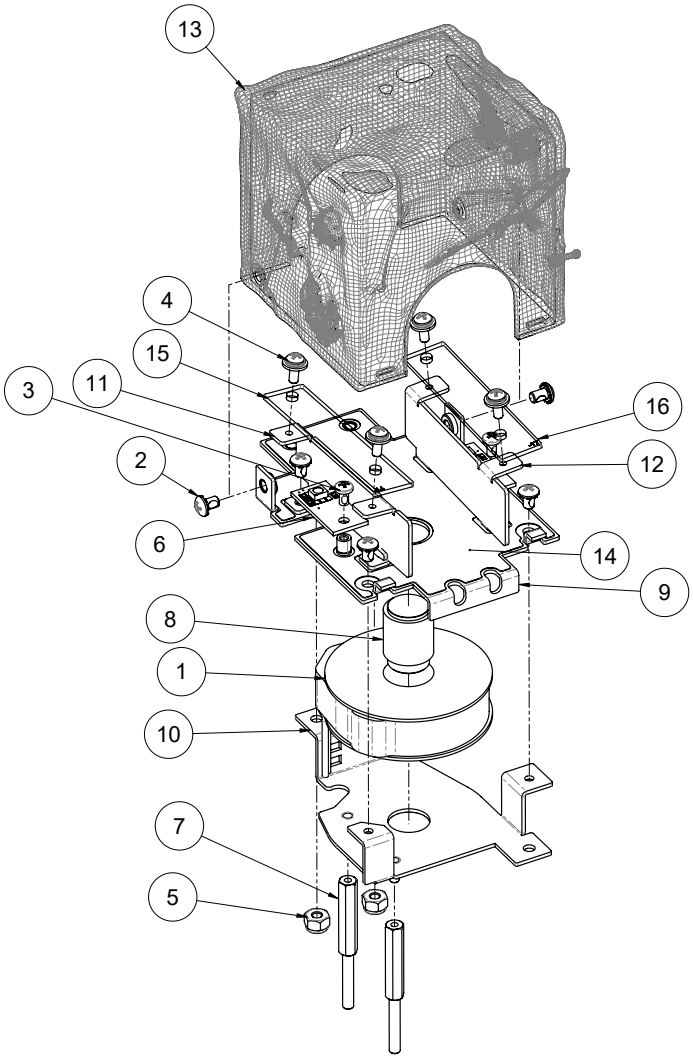
5.30 CUBE ASSEMBLY

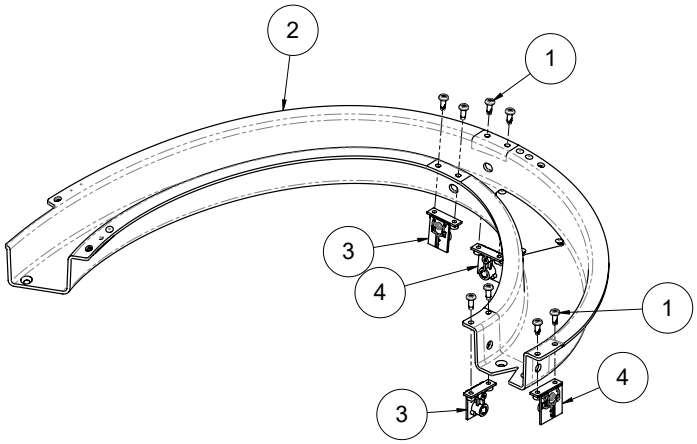
500-9956-00



ID	Part Number	Description	Qty
1	511-5065-ND	MAGNET ASSY (22-650)	1
2	232-5300-00P	SCREW SEMS, PPH, 8-32 X 1/4", ZC, PATCH	6
3	237-5500-01P	SCREW, PPH, 6-32 X 1/4", BLK, PATCH	2
4	237-6378-00P	SCREW, PPH DBL SEMS, 6-32 X 3/8", ZC, PATCH	4
5	240-5102-00	8-32 NYLON LOCK NUT	2
6	520-5333-00	RGB-COLOR LED BOARD	2
7	530-8083-00	MAGNET BRKT SUPPORT, D&D	2
8	530-8084-00	MAGNET CORE, D&D	1
9	535-4121-00	CUBE BASE, D&D	1
10	535-4122-00	MAGNET CLAMP, D&D	1
11	535-5176-01	BALL GUIDE LH, CUBE, D&D	1
12	535-5176-02	BALL GUIDE RH, CUBE, D&D	1
13	545-7939-00	GELATINOUS CUBE, D&D	1
14	820-7958-35	DECAL -35, CUBE BRACKET, D&D	1
15	830-8555-16	PLASTIC -16, D&D	1
16	830-8555-17	PLASTIC -17, D&D	1

5.31 CUBE RAMP ASSEMBLY

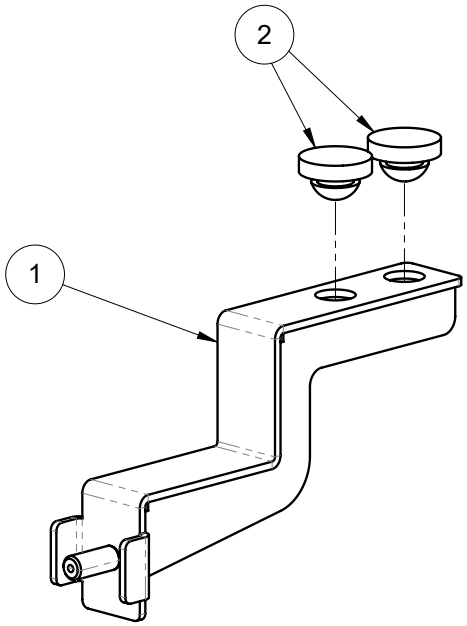
511-5471-00



ID	Part Number	Description	Qty
1	237-5880-00	SCREW, #6 X 3/8 PPH T-25	8
2	510-1063-00	ASSEMBLY, RIVETED CUBE RAMP	1
3	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	2
4	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	2

5.32 CUBE RAMP SUPPORT

511-0031-00



ID	Part Number	Description	Qty
1	535-3075-00	BRACKET, CUBE RAMP SUPPORT	1
2	545-5105-00	RUBBER BUMPER	2

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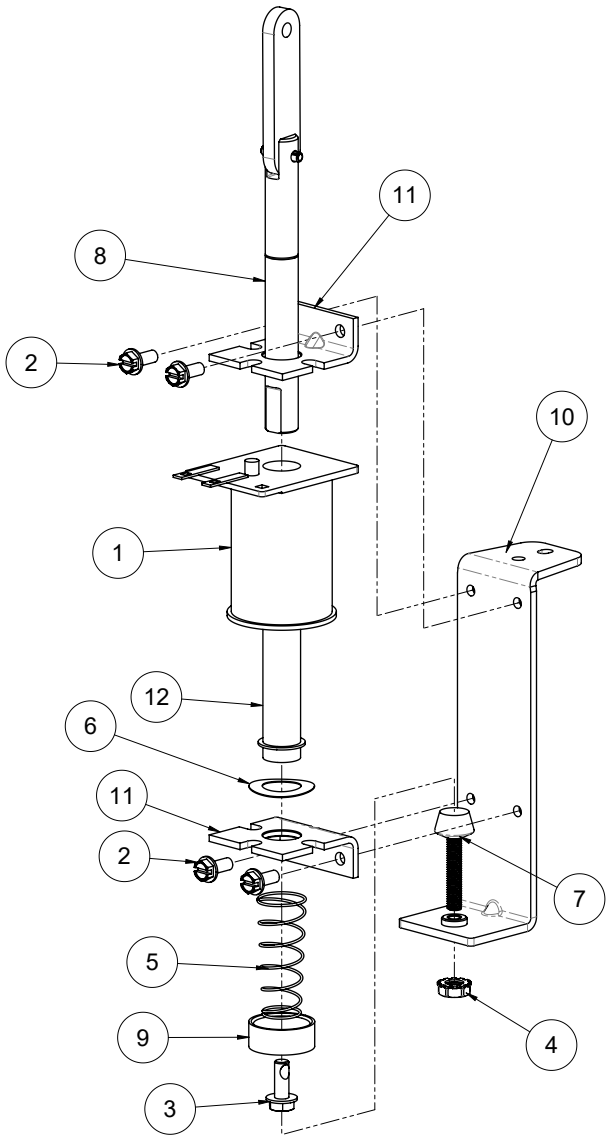
5.33 UP/DOWN RAMP COIL ASSEMBLY

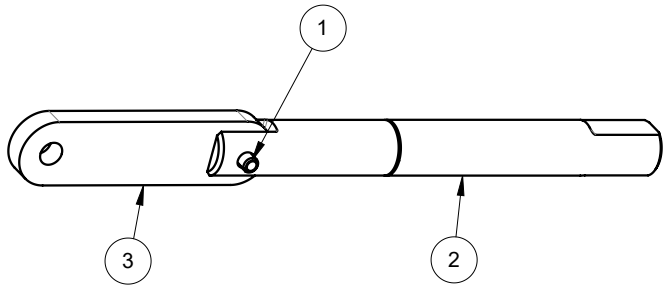
511-1186-00



ID	Part Number	Description	Qty
1	090-5032-ND	COIL - 22-1080 - NO DIODE	1
2	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	4
3	237-5995-00P	SCREW, 10-32 X 1/2" HWH SERR MS ZI, PATCH	1
4	240-5208-00	10-32 KEPS NUT	1
5	266-5020-01	COMPRESSION SPRING-CONICAL	1
6	269-5002-00	SPRING WASHER	1
7	280-5014-00	ADJUSTABLE BUMPER/STOP	1
8	511-1187-00	ASSEMBLY, PLUNGER-LINK	1
9	530-5511-00	PLUNGER HEAD	1
10	535-5563-00	BRACKET, UP/DN RAMP COIL	1
11	535-7356-00	COIL BRACKET	2
12	545-5847-00	COIL SLEEVE	1

5.34 UP/DOWN RAMP PLUNGER LINK ASSEMBLY

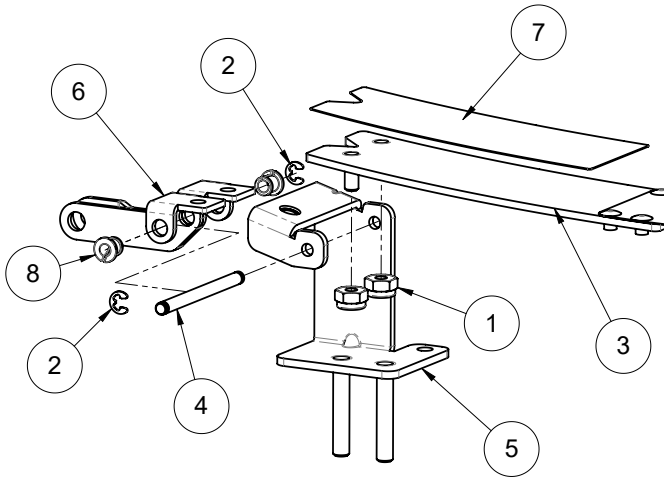
511-1187-00



ID	Part Number	Description	Qty
1	251-5008-00	ROLL PIN, 1/8 X 5/8	1
2	515-3005-00	ASSEMBLY, SOLID PLUNGER	1
3	545-7887-08	DRIVE LINKAGE-NYLON	1

5.35 UP/DOWN RAMP ASSEMBLY

511-5470-00



ID	Part Number	Description	Qty
1	240-5005-00	6-32 NYLON STOP NUT	2
2	270-5000-00	RETAINING E-RING, 1/8" SHAFT OD	2
3	510-7972-00	RIVETED ASSEMBLY,UP/DOWN RAMP	1
4	530-1032-22	PIVOT PIN .125" DIA - 1.500" LENGTH	1
5	535-4127-00	UP/DN RAMP SUPPORT	1
6	535-4128-00	UP-DN RAMP HINGE	1
7	820-7958-19	DECAL #19, UP/DN RAMP	1
8	545-5335-00	NYLINER, 1/8" SHAFT, 2L2-FF	2

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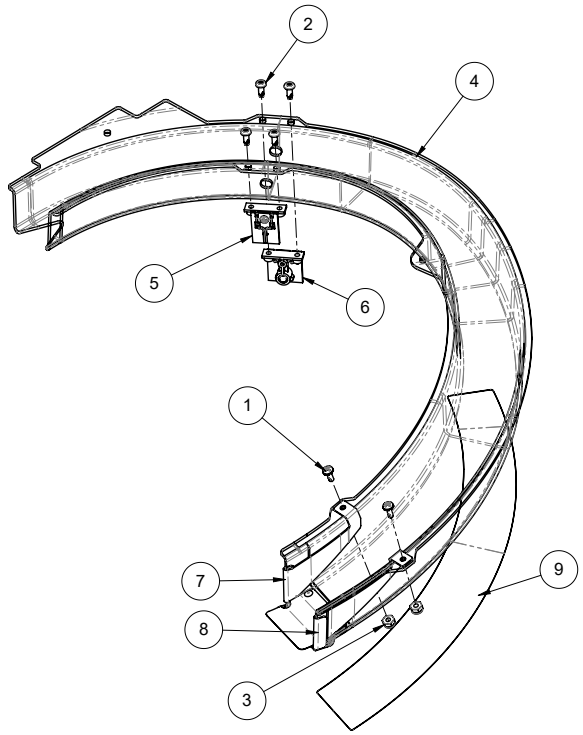
5.36 RIGHT RAMP ASSEMBLY

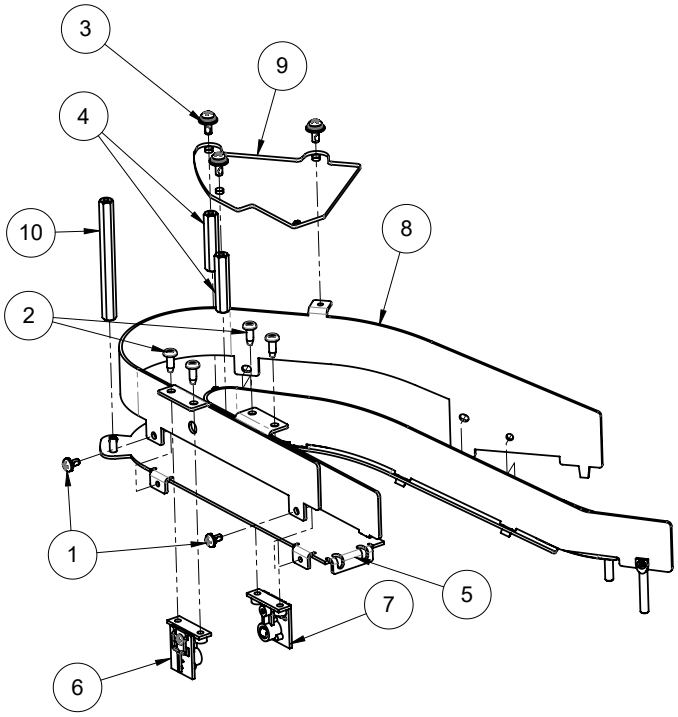
500-2701-00

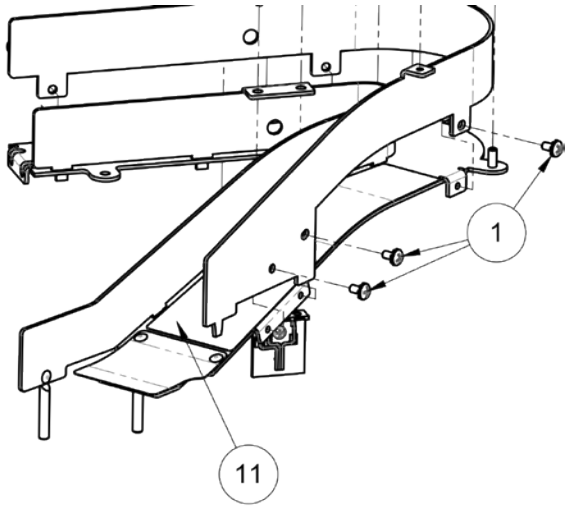


ID	Part Number	Description	Qty
1	232-5201-00P	SCREW, 6-32 X 3/8" PPH MS SEMS, PATCH	2
2	237-5880-00	SCREW, #6 X 3/8 PPH T-25	4
3	240-5005-00	6-32 NYLON STOP NUT	2
4	510-7964-00	RIVETED RIGHT RAMP ASSEMBLY	1
5	515-0215-00	LONG RANGE OPTO EMITTER	1
6	515-0215-01	LONG RANGE OPTO RECEIVER	1
7	535-3047-00	RAMP PROTECTOR, LEFT, RIGHT RAMP	1
8	535-3048-00	RAMP PROTECTOR, RIGHT, RIGHT RAMP	1
9	820-1074-00	DECAL, RIGHT RAMP	1

5.37 LEFT RAMP ASSEMBLY

511-5367-00





ID	Part Number	Description	Qty
1	232-5200-00P	SCREW, 6-32 X 1/4" PPH SEMS, PATCH	5
2	237-5880-00	SCREW, #6 X 3/8 PPH T-25	4
3	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	3
4	254-5008-11	HEX SPACER - 1-1/4"	2
5	510-7956-00	RIVETED FLAP ASSEMBLY, LEFT RAMP	1
6	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
7	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
8	535-3018-02	RAMP OUTER WALL, LEFT RAMP	1
9	830-1045-15	PLASTIC -15, DUNGEONS & DRAGONS	1
10	254-5008-08	HEX SPACER - 2-5/8"	1
11	820-7958-20	DECAL -20, LEFT RAMP	1

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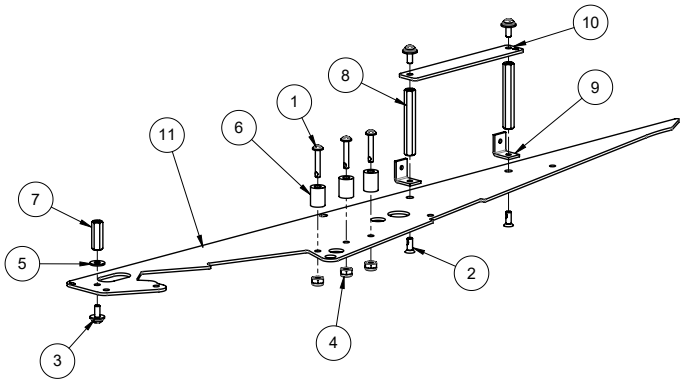
5.38 PLASTIC 06 ASSEMBLY

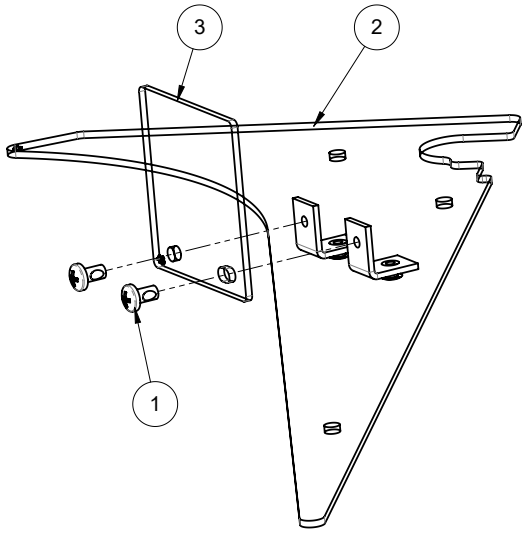
511-5393-06



ID	Part Number	Description	Qty
1	237-5504-00P	SCREW, 6-32 X 3/4" PPH MS, PATCH	3
2	237-5871-00P	SCREW, 6-32 X 3/8" PFH 82° U/C ZINC, PATCH	2
3	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	3
4	240-5005-00	6-32 NYLON STOP NUT	3
5	242-5001-00	#6 WASHER	1
6	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	3
7	254-5008-04	HEX SPACER - 3/4"	1
8	254-5008-10	HEX SPACER - 1-3/4"	2
9	535-1305-10	BRACKET - PLASTIC MTG - 90°	2
10	830-1045-25	PLASTIC -25, DUNGEONS & DRAGONS	1
11	830-8555-06	PLASTIC -06, DUNGEONS & DRAGONS	1

5.39 PLASTIC 07 ASSEMBLY

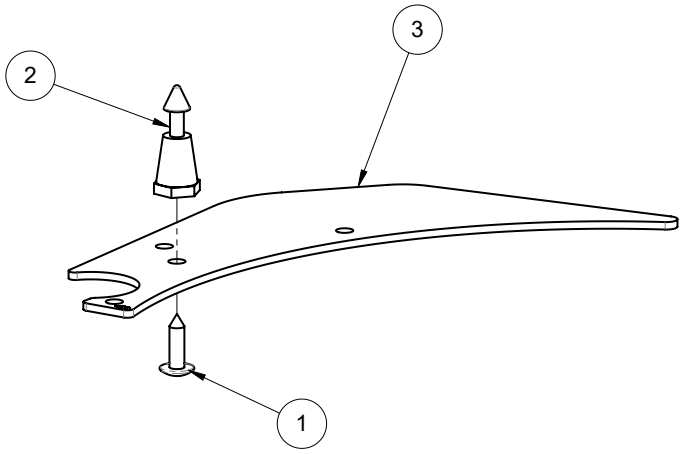
511-5393-07



ID	Part Number	Description	Qty
1	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	2
2	510-7974-07	RIVETED ASSEMBLY, PLASTIC -07, DUNGEONS & DRAGONS	1
3	830-1045-26	PLASTIC -26, DUNGEONS & DRAGONS	1

5.40 PLASTIC 09 ASSEMBLY

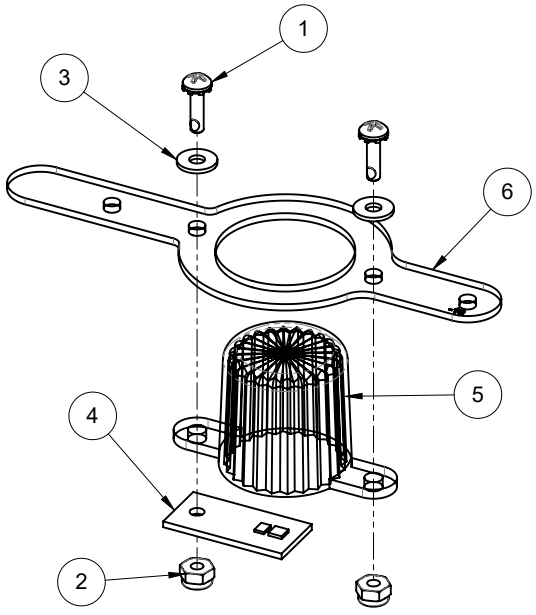
511-5393-09



ID	Part Number	Description	Qty
1	237-5809-00	SCREW, #6 X 1/2" PTH A	1
2	550-5052-01	MINI POST - CLEAR	1
3	830-8555-09	PLASTIC -09, DUNGEONS & DRAGONS	1

5.41 PLASTIC 13 ASSEMBLY

511-5393-13



ID	Part Number	Description	Qty
1	232-5202-00P	SCREW, 6-32 X 1/2" PPH MS SEMS, PATCH	2
2	240-5005-00	6-32 NYLON STOP NUT	2
3	242-5001-00	#6 WASHER	2
4	520-7000-00	SINGLE FLASH LED BOARD	1
5	550-5031-03	MINI MARS W/ EARS - AMBER SB	1
6	830-8555-13	PLASTIC -13, DUNGEONS & DRAGONS	1

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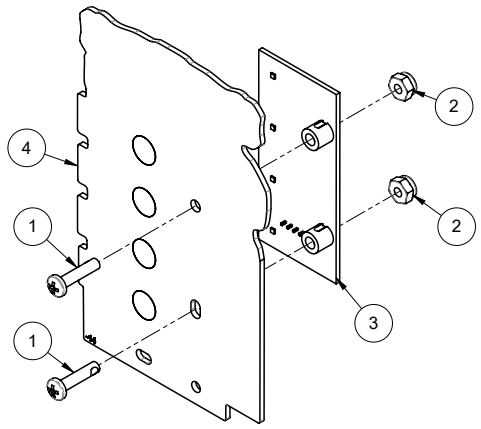
5.42 PLASTIC 14 ASSEMBLY

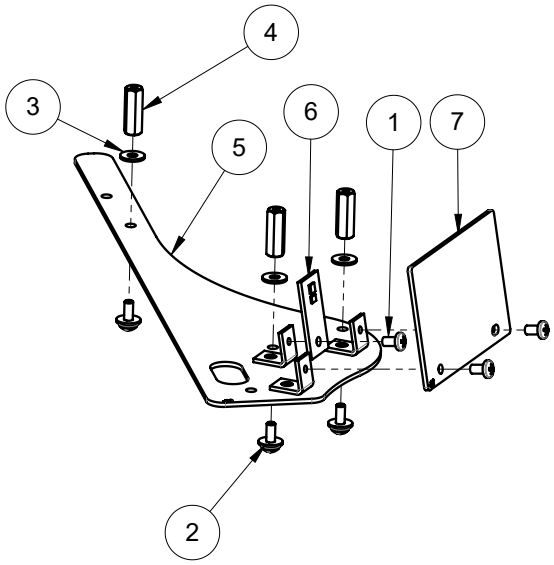
511-5393-14



ID	Part Number	Description	Qty
1	237-5503-01P	SCREW, 6-32 X 5/8" PPH MS BLACK, PATCH	2
2	240-5005-00	6-32 NYLON STOP NUT	2
3	520-1076-00	PCA BILL-BRD MINI-PLYFLD 4-LED	1
4	830-8555-14	PLASTIC -14, DUNGEONS & DRAGONS	1

5.43 PLASTIC 20 ASSEMBLY

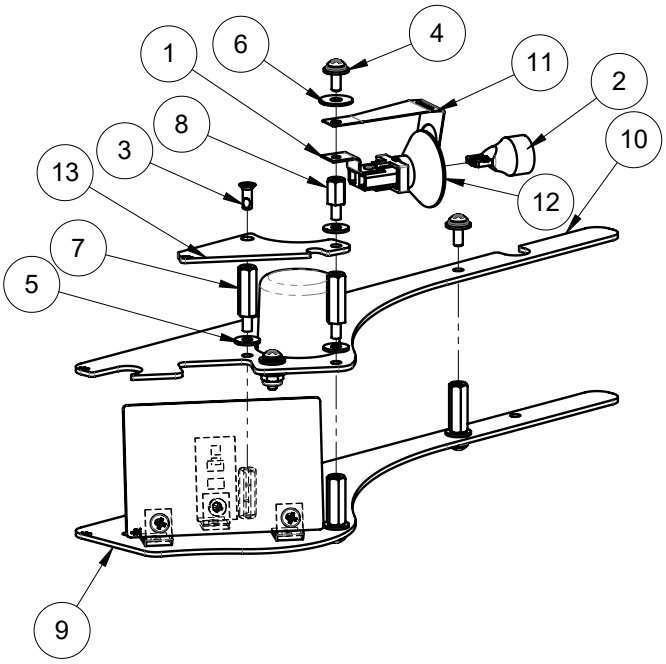
511-5393-20



ID	Part Number	Description	Qty
1	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	3
2	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	3
3	242-5001-00	#6 WASHER	3
4	254-5008-04	HEX SPACER - 3/4"	3
5	510-7974-20	RIVETED ASSEMBLY, PLASTIC -20, DUNGEONS & DRAGONS	1
6	520-7000-00	SINGLE FLASH LED BOARD	1
7	830-8555-21	PLASTIC -21, DUNGEONS & DRAGONS	1

5.44 PLASTIC 21 ASSEMBLY

511-5393-21



ID	Part Number	Description	Qty
1	077-5026-01	SOCKET, L/D WEDGE BASE BLACK	1
2	113-5032-08	8 ELEMENT FLAT W-BASE LED 5V AC - WHITE	1
3	237-5871-00P	SCREW, 6-32 X 3/8" PFH 82° U/C ZINC, PATCH	1
4	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	2
5	242-5001-00	#6 WASHER	3
6	242-5015-00	#8 WASHER - .170 ID X 1/2 OD X .042	1
7	254-5024-04	HEX SPACER MALE/FEMALE - 3/4"	2
8	254-5024-12	HEX SPACER MALE/FEMALE - 3/8"	1
9	511-5393-20	ASSEMBLY, PLASTIC -20, DUNGEONS & DRAGONS	1
10	511-5393-22	ASSEMBLY, PLASTIC -22, DUNGEONS & DRAGONS	1
11	535-1324-01	W.B. LED SPOTLAMP RETAINER CLIP	1
12	545-5409-01	REFLECTOR	1
13	830-1045-27	PLASTIC -27, DUNGEONS & DRAGONS	1

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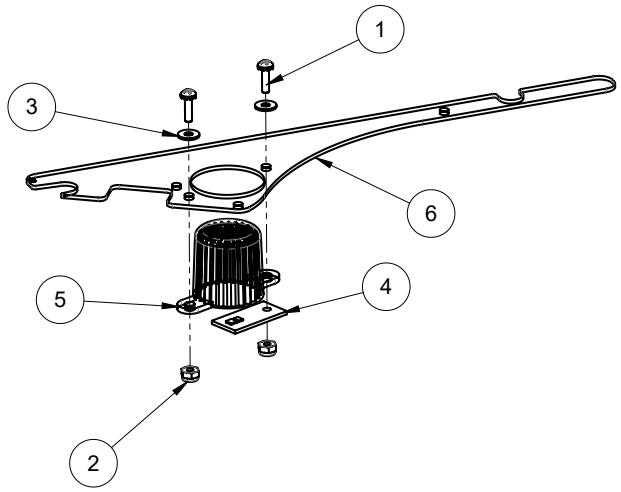
5.45 PLASTIC 22 ASSEMBLY

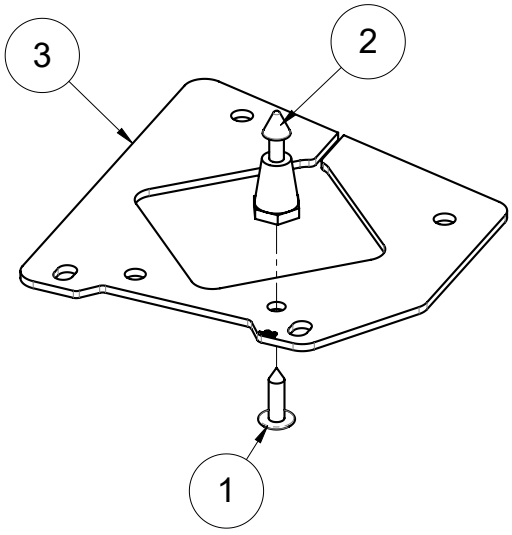
511-5393-22



ID	Part Number	Description	Qty
1	232-5202-00P	SCREW, 6-32 X 1/2" PPH MS SEMS, PATCH	2
2	240-5005-00	6-32 NYLON STOP NUT	2
3	242-5001-00	#6 WASHER	2
4	520-7000-00	SINGLE FLASH LED BOARD	1
5	550-5031-03	MINI MARS W/ EARS - AMBER SB	1
6	830-8555-22	PLASTIC -22, DUNGEONS & DRAGONS	1

5.46 PLASTIC 28 ASSEMBLY

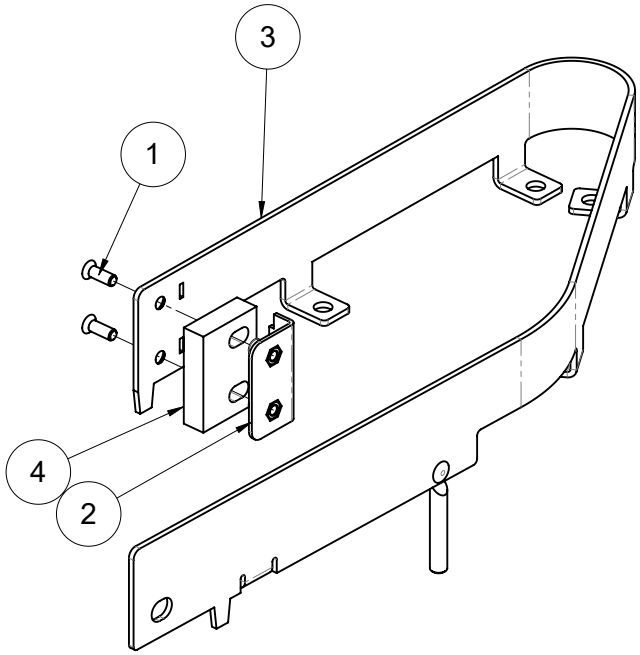
511-5393-28



ID	Part Number	Description	Qty
1	237-5809-00	SCREW, #6 X 1/2" PTH A	1
2	550-5052-01	MINI POST - CLEAR	1
3	830-1045-28	PLASTIC -28, DUNGEONS & DRAGONS	1

5.47 BALL GUIDE 07 ASSEMBLY

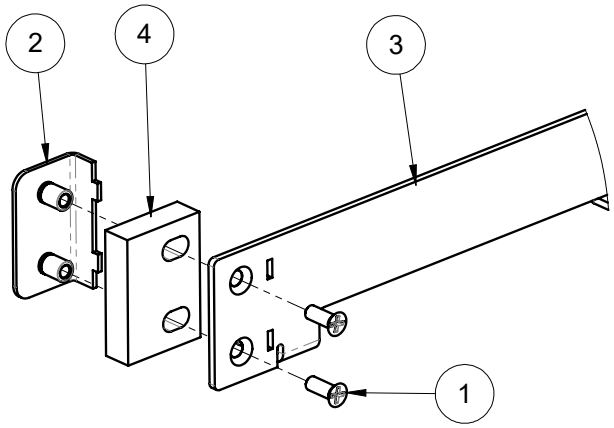
511-8965-07



ID	Part Number	Description	Qty
1	237-6151-00P	SCREW, 4-40 X 5/16" PFH U/C MS	2
2	535-1355-00	RIGHT RAMP EDGE PROTECTOR	1
3	535-4085-07	BALL GUIDE #07, DUNGEONS & DRAGONS	1
4	626-5057-01	GUIDE BUMPER	1

5.48 BALL GUIDE 16 ASSEMBLY

511-8965-16



ID	Part Number	Description	Qty
1	237-6151-00P	SCREW, 4-40 X 5/16" PFH U/C MS	2
2	535-1355-00	RIGHT RAMP EDGE PROTECTOR PRO	1
3	535-4085-16	BALL GUIDE #16	1
4	626-5057-01	GUIDE BUMPER	1

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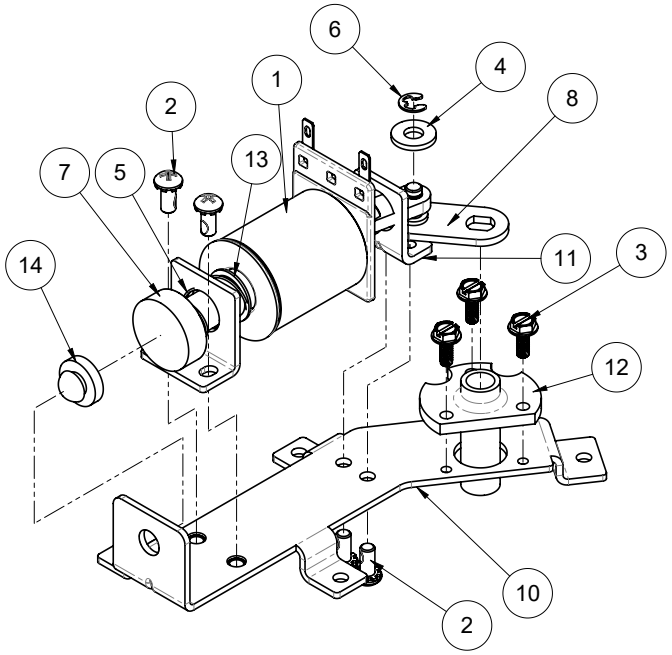
5.49 DIVERTER ACTUATOR

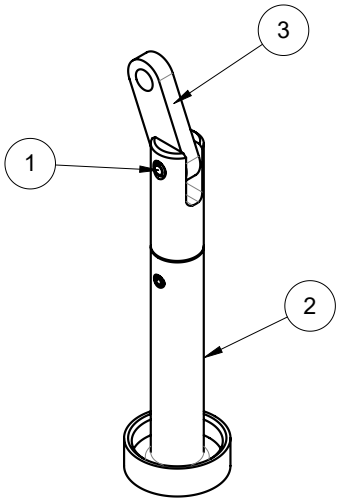
500-2955-00



ID	Part Number	Description	Qty
1	090-5044-ND	COIL 26-1200 - NO DIODE	1
2	232-5301-00P	SCREW, 8-32 X 3/8" PPH SEMS, PATCH	4
3	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
4	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	1
5	266-5020-00	COMPRESSION SPRING-CONICAL	1
6	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
7	511-5442-00	ASSEMBLY, PLUNGER-LINK	1
8	515-7886-00	CRANK ARM, DIVERTER	1
9	535-0418-00	COIL BRACKET	1
10	535-5182-00	BRACKET, DIVERTER ACTUATOR	1
11	535-5203-03	COIL RETAINING BRACKET	1
12	545-5070-10	FLIPPER BUSHING - MODIFIED .315 I.D.	1
13	545-5076-01	COIL SLEEVE	1
14	545-5105-00	RUBBER BUMPER	1

5.50 DIVERTER PLUNGER LINK

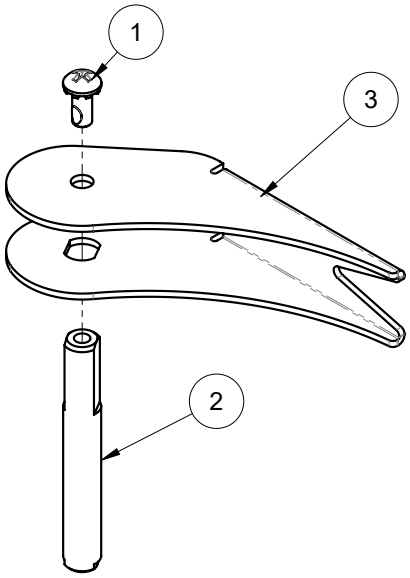
511-5442-00



ID	Part Number	Description	Qty
1	251-5020-00	ROLL PIN, 1/8 X 7/16	1
2	515-7887-00	ASSEMBLY, STEEL PLUNGER	1
3	546-2739-00	LINK, DIVERTER ACTUATOR	1

5.51 DIVERTER GATE

511-5441-00



ID	Part Number	Description	Qty
1	232-5301-00P	SCREW, 8-32 X 3/8" PPH SEMS, PATCH	1
2	530-9006-00	SHAFT, DIVERTER GATE	1
3	535-4085-10	DIVERTER GATE	1

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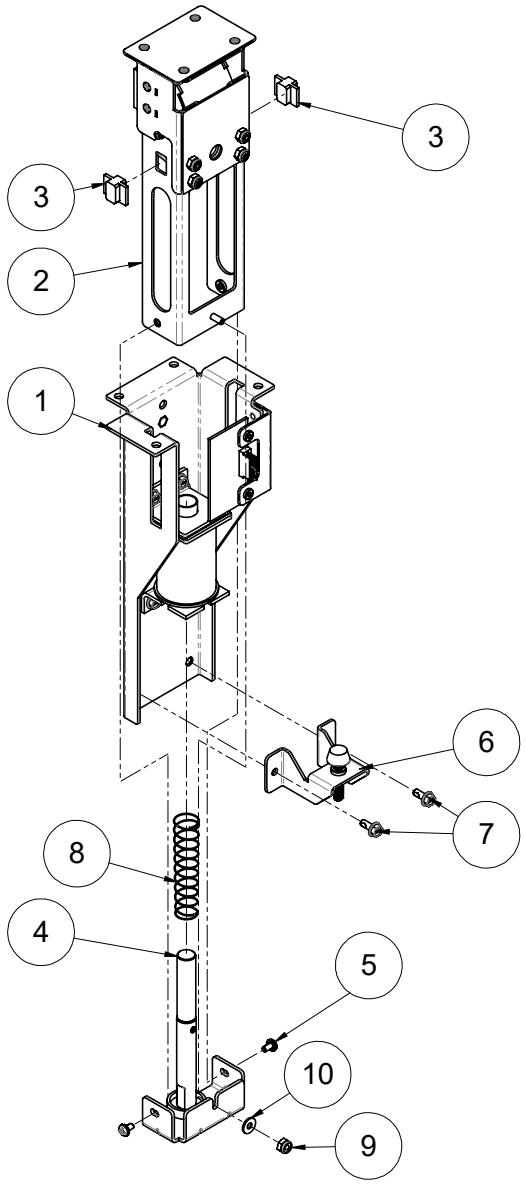
5.52 DUNGEON (HIDDEN VUK) ASSEMBLY

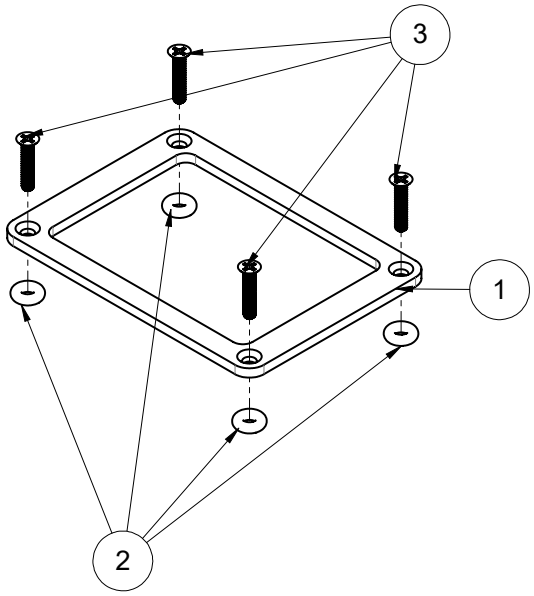
500-2948-00



ID	Part Number	Description	Qty
1	511-9775-00	ASSEMBLY, DUNGEON HOUSING	1
2	511-9760-00	ASSEMBLY, HIDDEN VUK CARRIAGE	1
3	546-7712-00	GLIDE PAD	2
4	511-9758-00	ASSEMBLY, UP/DN COIL PLUNGER	1
5	232-5200-00P	SCREW, 6-32 X 1/4" PPH SEMS, PATCH	2
6	511-0040-00	ADJUSTABLE END STOP ASSEMBLY	1
7	237-5903-00P	SCREW, 8-32 X 3/8" HWH, PATCH	2
8	266-5034-01	COMPRESSION SPRING	1
9	240-5005-00	6-32 NYLON STOP NUT	1
10	242-5001-00	#6 WASHER	1

5.53 HIDDEN VUK EDGE PROTECTOR

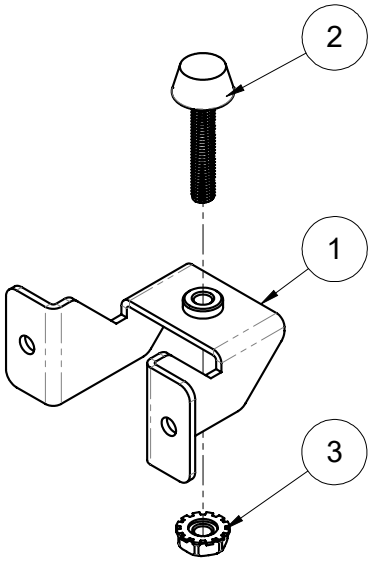
511-8565-00



ID	Part Number	Description	Qty
1	515-7862-00	HIDDEN VUK SLIDER WELDMENT	1
2	511-9759-00	DUNGEON CAP ASSEMBLY	1
3	535-5562-00	SCOOP BACK PLATE, HIDDEN VUK	1
4	240-5005-00	6-32 NYLON STOP NUT	4

5.54 ADJUSTABLE END STOP

511-0040-00



ID	Part Number	Description	Qty
1	515-2884-00	BOTTOM STOP, HIDDEN VUK	1
2	280-5014-00	ADJUSTABLE BUMPER STOP	1
3	240-5208-00	10-32 KEPS NUT	1

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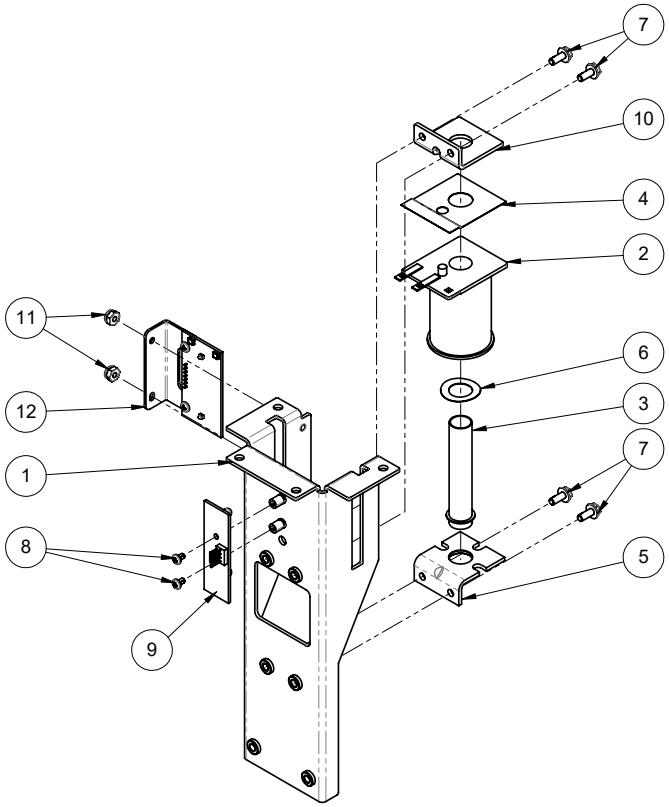
5.55 DUNGEON HOUSING ASSEMBLY

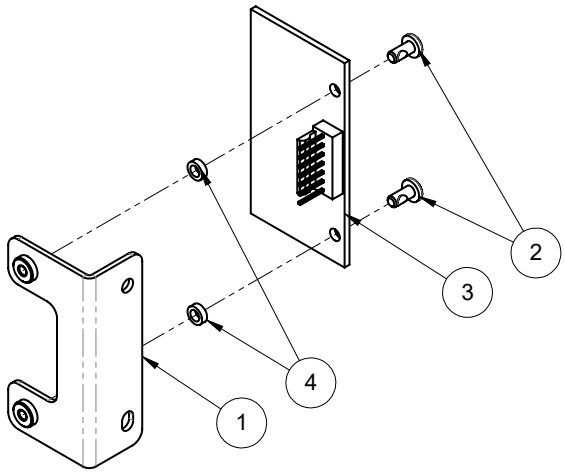
511-9775-00



ID	Part Number	Description	Qty
1	535-5133-00	HIDDEN VUK BOTTOM FRAME	1
2	090-5032-ND	COIL - 22-1080 - NO DIODE	1
3	545-5847-00	COIL SLEEVE	1
4	523-0044-00	FISCHE PAPER, FLIPPER COIL	1
5	535-7356-00	COIL BRACKET	1
6	269-5002-00	SPRING WASHER	1
7	237-5903-00P	SCREW, 8-32 X 3/8" HWH, PATCH	4
8	237-5912-00P	SCREW, 4-40 X 3/16" PPH MS, PATCH	2
9	520-8675-00	OPTO DUAL EMITTER	1
10	535-0830-00	COIL BRACKET	1
11	240-5005-00	6-32 NYLON STOP NUT	2
12	511-0039-00	OPTO RECEIVER ASSEMBLY	1

5.56 OPTO RECEIVER ASSEMBLY

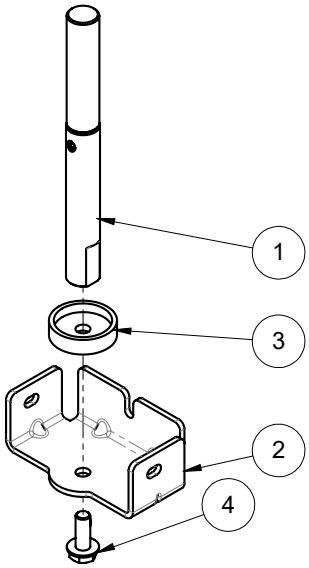
511-0039-00



ID	Part Number	Description	Qty
1	515-3004-00	BRACKET, OPTO MOUNT, HIDDEN VUK	1
2	237-6169-00P	SCREW, 4-40 X 1/4 PPH MS, PATCH	2
3	520-8676-00	OPTO DUAL RECEIVER	1
4	254-5090-06	PLASTIC SPACER #4 SCREW, 3/16" OD - 1/16" LENGTH	2

5.57 UP/DOWN COIL PLUNGER ASSEMBLY

511-9758-00



ID	Part Number	Description	Qty
1	515-7877-00	HIDDEN VUK PLUNGER ASM	1
2	535-5157-00	DUNGEON BOTTOM CAP	1
3	530-5511-01	SHAFT HEAD	1
4	237-5995-00P	SCREW, 10-32 X 1/2" HWH SERR MS ZI, PATCH	1

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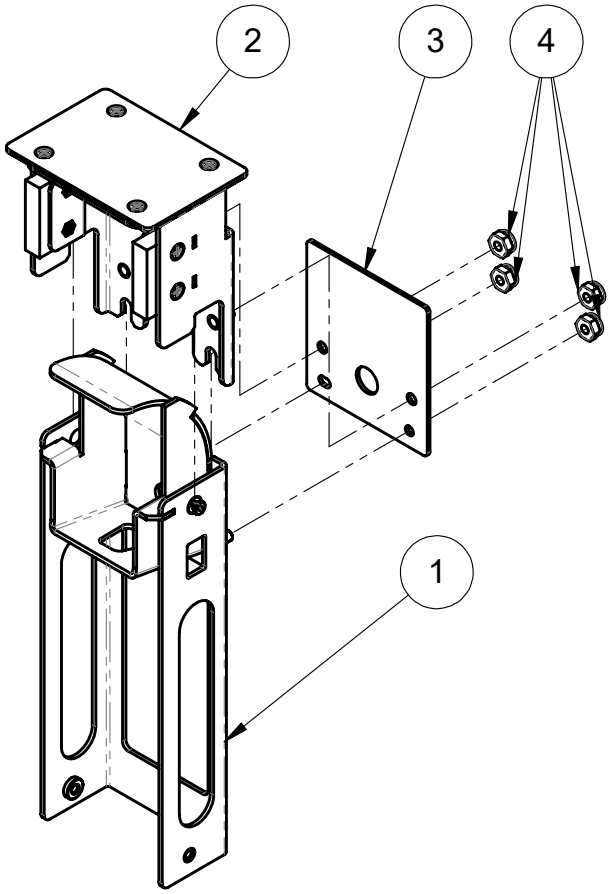
5.58 HIDDEN VUK CARRIAGE ASSEMBLY

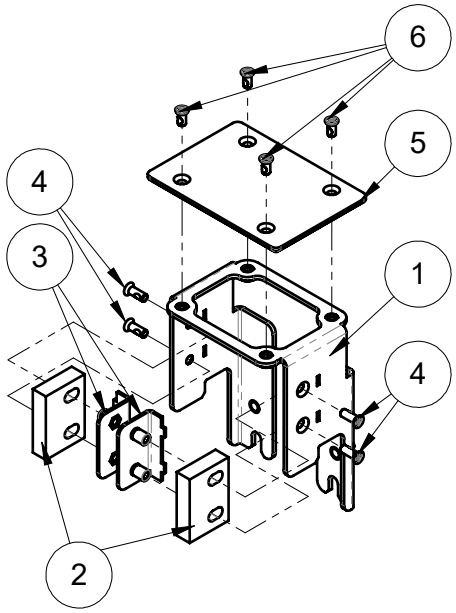
511-9760-00



ID	Part Number	Description	Qty
1	515-7862-00	HIDDEN VUK SLIDER WELDMENT	1
2	511-9759-00	DUNGEON CAP ASSEMBLY	1
3	535-5562-00	SCOOP BACK PLATE, HIDDEN VUK	1
4	240-5005-00	6-32 NYLON STOP NUT	4

5.59 DUNGEON CAP ASSEMBLY

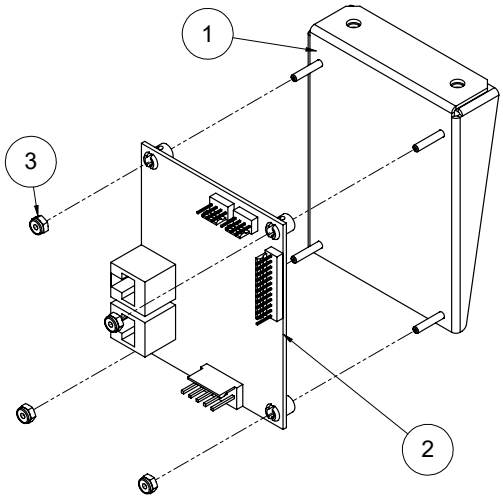
511-9759-00



ID	Part Number	Description	Qty
1	535-5132-00	HIDDEN VUK TOP FRAME	1
2	626-5057-01	GUIDE BUMPER	2
3	535-1355-00	RIGHT RAMP EDGE PROTECTOR	2
4	237-6151-00P	SCREW, 4-40 X 5/16" PFH U/C MS	4
5	830-6965-00	HIDDEN VUK COVER	1
6	237-5983-02P	SCREW, 4-40 x 1/4" PFH MS, BLACK, PATCH	4

5.60 STEPPER BOARD ASSEMBLY

511-1188-00



ID	Part Number	Description	Qty
1	535-3096-00	STEPPER BOARD MOUNTING BRACKET	1
2	520-5379-22	2 STEPPER DRIVER NODE BOARD, 24 VDC	1
3	240-5303-00	4-40 NYLON LOCK NUT	4

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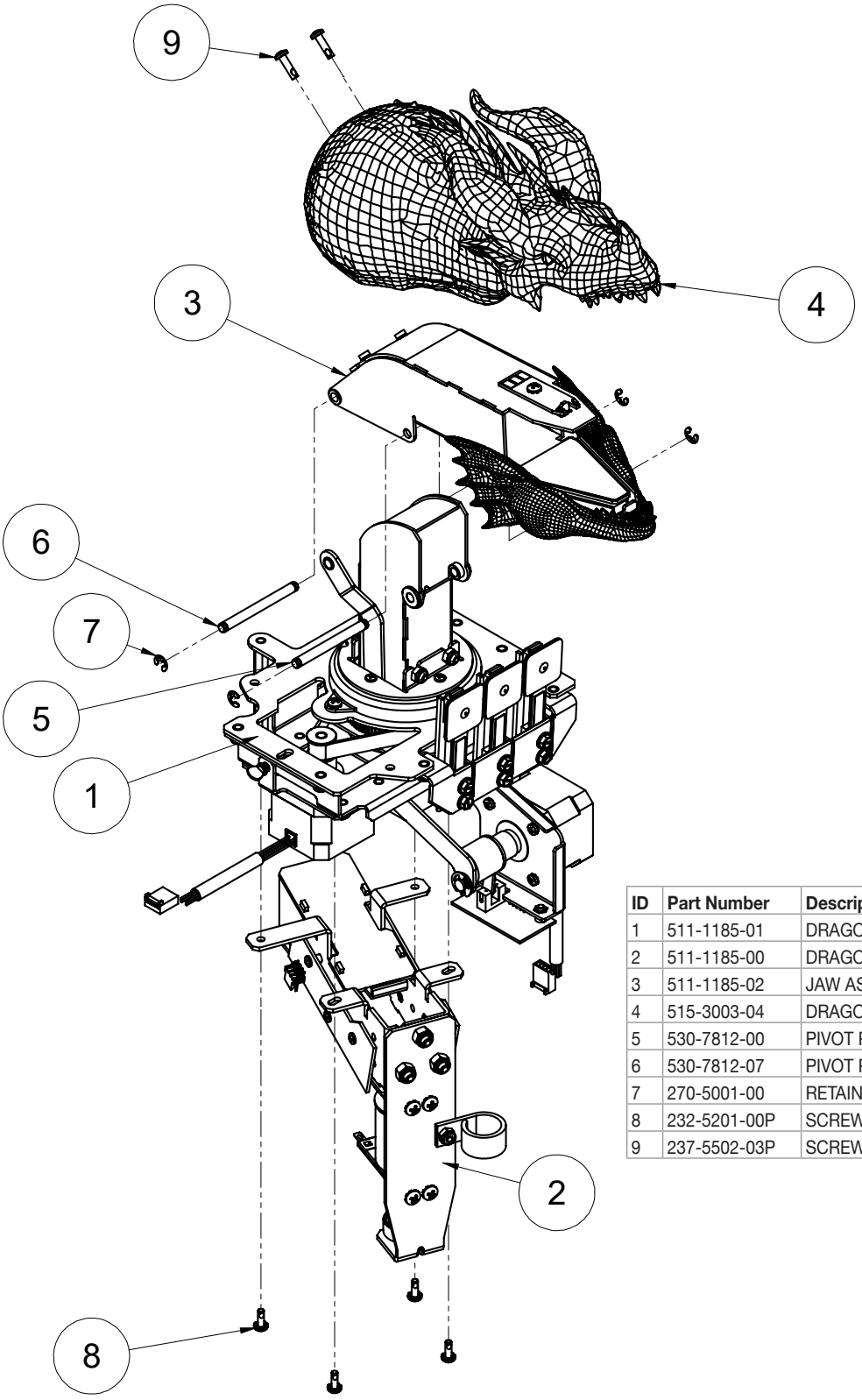
5.61 DRAGON MECH FINAL ASSEMBLY



ID	Part Number	Description	Qty
1	511-1185-01	DRAGON LOWER PLAYFIELD ASM	1
2	511-1185-00	DRAGON BALL LOCK ASM	1
3	511-1185-02	JAW ASM	1
4	515-3003-04	DRAGON HEAD ASM	1
5	530-7812-00	PIVOT PIN-.188 DIA.	1
6	530-7812-07	PIVOT PIN-.188 DIA.	1
7	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	4
8	232-5201-00P	SCREW, 6-32 X 3/8" PPH MS SEMS, PATCH	4
9	237-5502-03P	SCREW, 6-32 X 1/2" PPH MS BLACK, PATCH	2

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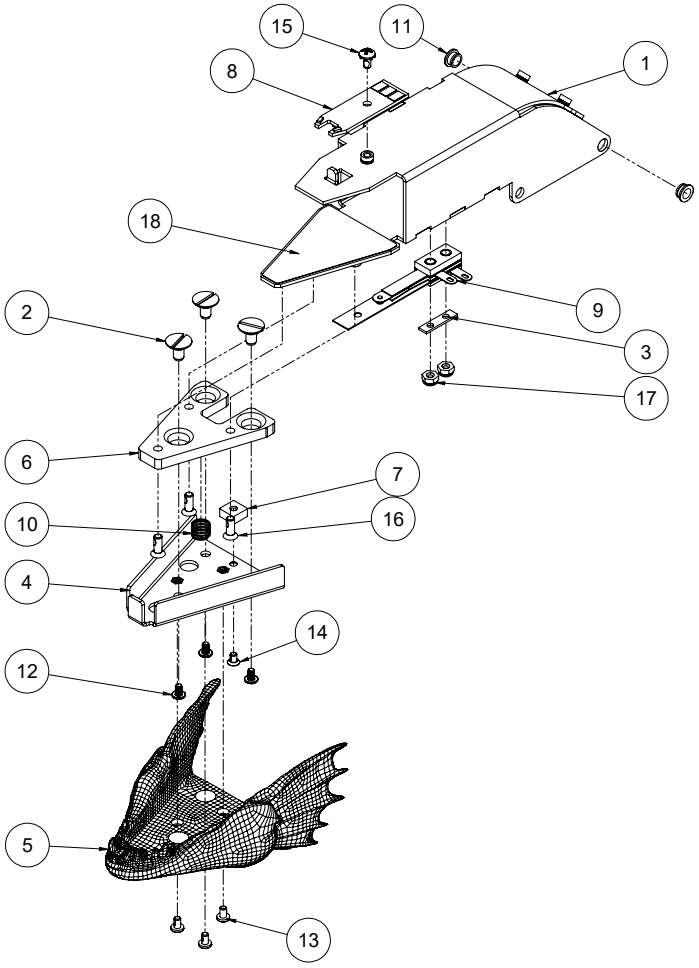
5.62 DRAGON JAW ASSEMBLY

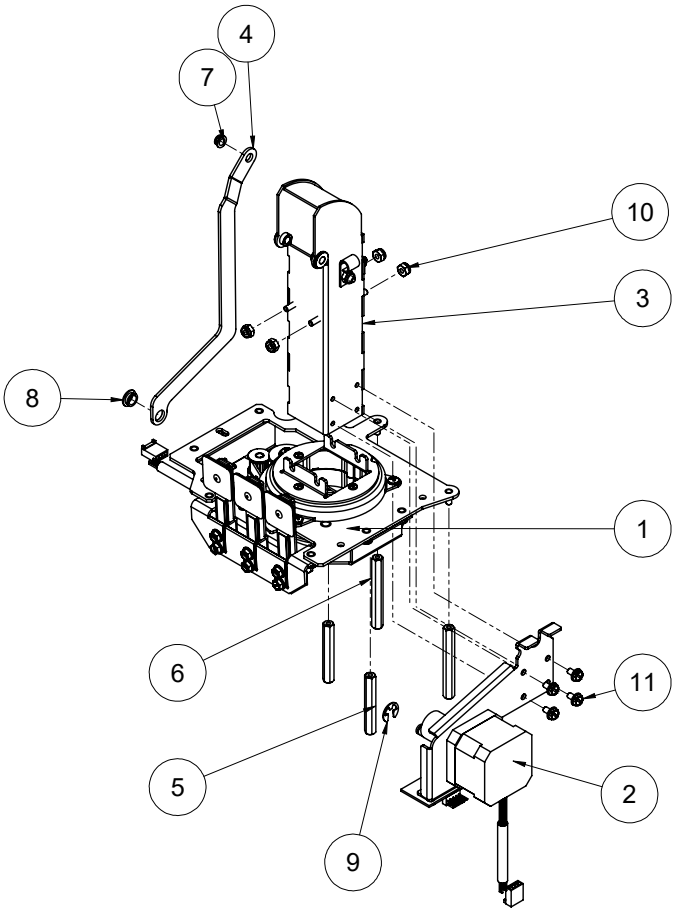
511-1185-02



ID	Part Number	Description	Qty
1	515-3003-03	SCOOP HOOD	1
2	530-5809-07	WEDGE SCREW	3
3	535-6539-00	SWITCH BODY PROTECT PLATE	1
4	535-3317-07	DRAGON JAW CONTACT	1
5	545-7946-00	DRAGON JAW	1
6	546-7971-00	DRAGON JAW PLASTIC	1
7	546-7971-01	PLASTIC BUMPER	1
8	511-9781-00	DRAGON LED W/ WIRES	1
9	511-9780-00	DRAGON JAW HIT SWITCH W/ WIRES	1
10	266-5095-00	COMPRESSION SPRING	1
11	545-5352-00	NYLINER, 3/16" SHAFT	2
12	237-6402-00	FLANGED BUTTON HEAD SCREW, 4-40, 3/16"	3
13	237-5912-00P	SCREW, 4-40 X 3/16" PPH MS, PATCH	3
14	237-6197-00P	SCREW, 4-40 X 3/16 PFH U/C 18-8 SS, PATCH	1
15	232-5200-00P	SCREW, 6-32 X 1/4" PPH SEMS, PATCH	1
16	237-5871-00P	SCREW, 6-32 X 3/8" PFH 82° U/C ZINC, PATCH	3
17	240-5321-00	2-56 NYLON LOCK NUT	2
18	820-7958-36	DECAL #36, DRAGON TONGUE	1

5.63 DRAGON LOWER PLAYFIELD ASSEMBLY

511-1185-01



ID	Part Number	Description	Qty
1	511-1185-03	DRAGON BELT ASM	1
2	511-1185-05	DRAGON UP / DOWN ASM	1
3	511-1185-04	SCOOP HOOD ASM	1
4	535-3317-06	TILT LINK	1
5	254-5008-10	HEX SPACER - 1-3/4"	2
6	254-5008-32	HEX SPACER - 2-1/8"	2
7	545-5352-00	NYLINER, 3/16" SHAFT	1
8	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF	1
9	270-5002-00	RETAINING RING - 1/4"	1
10	240-5005-00	6-32 NYLON STOP NUT	4
11	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE, PATCH	4

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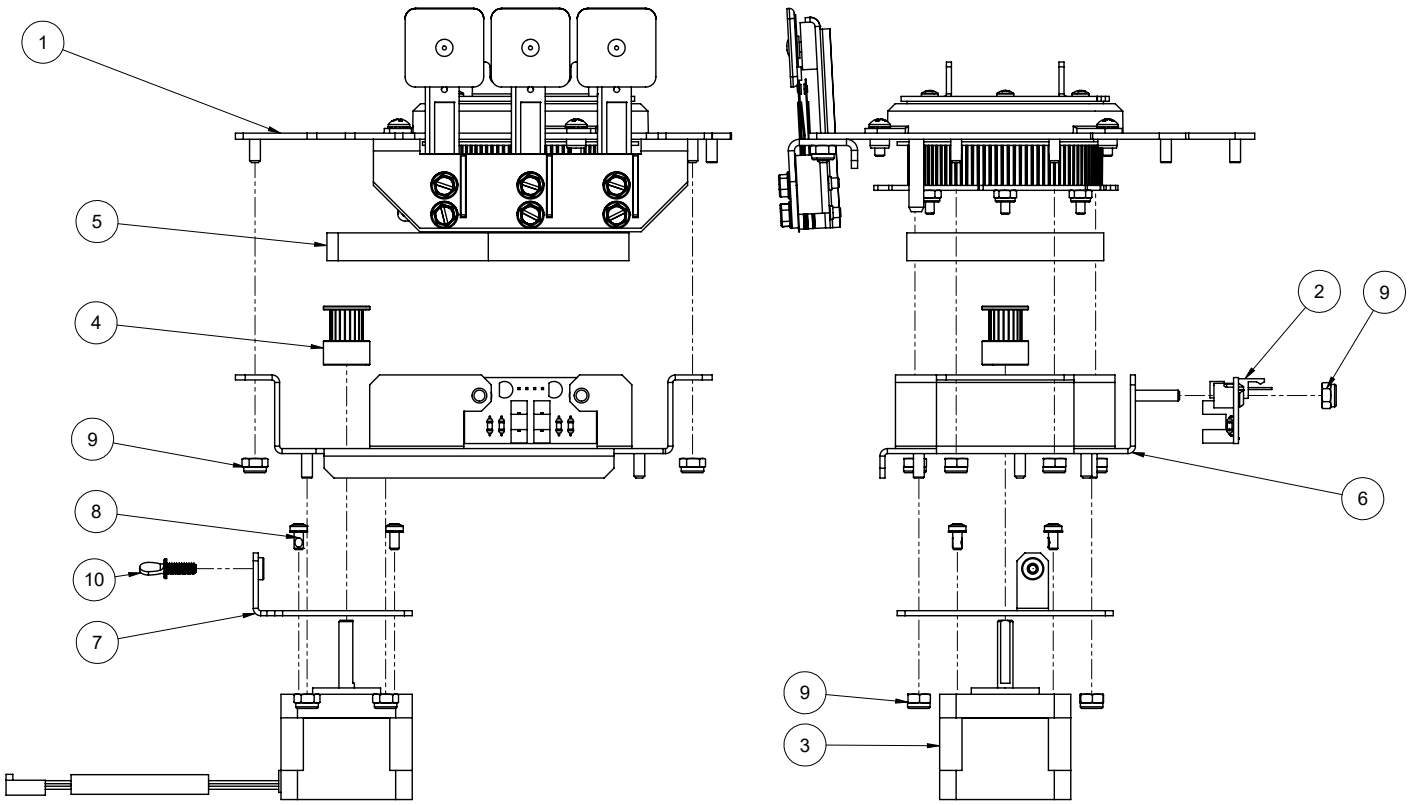
5.64 DRAGON BELT ASSEMBLY

511-1185-03



ID	Part Number	Description	Qty
1	511-1185-07	MAIN PLATE ASM	1
2	520-7021-01	DUAL-ENCODER OPTO PCB	1
3	515-9940-15	MOTOR/CABLE ASSEMBLY, STEPPER	1
4	042-5007-00	PULLEY, GT2-2MM, 9MM WIDE, 20T	1
*		M3 SET SCREW	1
5	545-1288-125	TIMING BELT, GT2 2MM, 9MM WIDE, SINGLE SIDED	1
6	535-3317-03	STEPPER BRACKET	1
7	535-3317-09	BELT TENSION BRACKET, MOTOR MOUNT	1
8	237-6188-01P	SCREW, M3X0.5 X 6MM PPH SEMS ZINC, PATCH	4
9	240-5005-00	6-32 NYLON STOP NUT	10
10	280-5075-00	FLANGED SPADE HEAD THUMB SCREW - 6-32 X 3/8"	1

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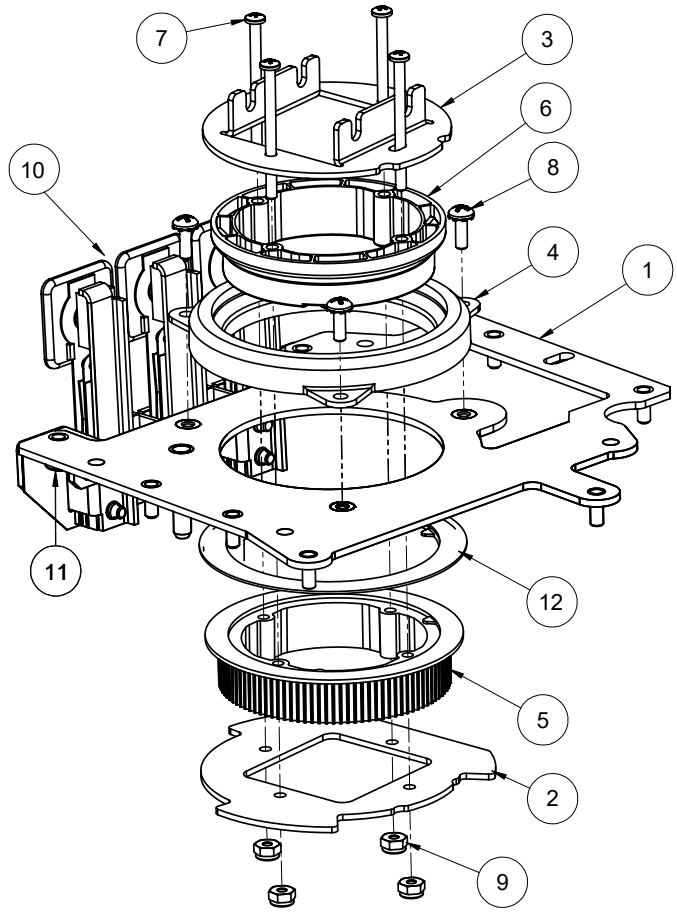
5.65 MAIN PLATE ASSEMBLY

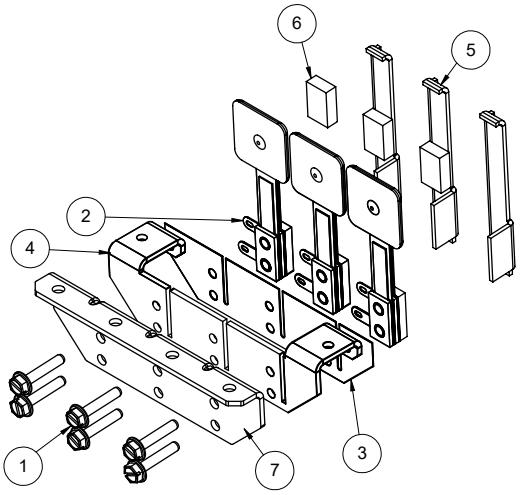
511-1185-07



ID	Part Number	Description	Qty
1	535-3317-01	MAIN PLATE	1
2	535-3317-02	PLATE, PULLEY STOP & OPTO	1
3	535-3317-08	BRACKET, DRAGON TUBE MOUNT	1
4	544-7952-00	MOLDED MOUNT RING, DRAGON BEARING	1
5	544-7952-01	MOLDED TOOTHED PULLEY, DRAGON BEARING	1
6	544-7952-02	MOLDED TUBE PIVOT, DRAGON BEARING	1
7	237-5934-00	SCREW, 4-40 X 1-1/2" PPH MS	4
8	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	3
9	240-5303-00	4-40 NYLON LOCK NUT	4
10	511-1185-10	TARGET BANK ASM	1
11	240-5005-00	6-32 NYLON STOP NUT	2
12	535-3317-14	BEARING SHIM	1

5.66 TARGET BANK ASSEMBLY

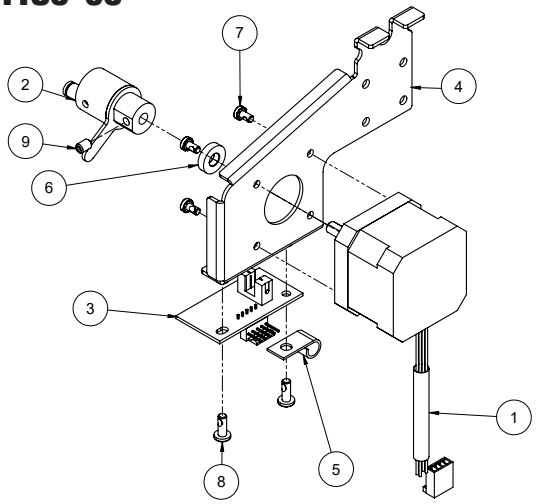
511-1185-10



ID	Part Number	Description	Qty
1	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE, SERRATED	6
2	515-9783-00-01	1" SQ. TARGET SWITCH - ANTILOFT- 2 LUG - BLACK	3
3	523-0048-00	FISCHE PAPER DRAGON	1
4	535-3317-00	TARGET MOUNT BRACKET	1
5	535-9823-02	SWITCH BACK PLATE - LOCKING	3
6	626-5078-00	3/16" FOAM PAD	3
7	535-3317-13	TARGET BANK BRACKET	1

5.67 DRAGON UP/DOWN ASSEMBLY

511-1185-05



ID	Part Number	Description	Qty
1	515-9940-24	MOTOR/CABLE ASSEMBLY, STEPPER	1
2	515-3003-01	CAM DRIVE WELDMENT	1
3	520-5357-00	PCB, INLINE DROP TARGET OPTO	1
4	535-3317-04	BRACKET, DRAGON JAW MOTOR MOUNT	1
5	040-5000-03	1/4" CABLE CLAMP	1
6	242-5676-00	ROUND SPACER	1
7	237-6188-01P	SCREW, M3x0.5 X 6MM PPH SEMS ZINC, PATCH	4
8	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	2
9	237-6130-00	SET SCREW, 8-32 X 1/4" CUP PT	1

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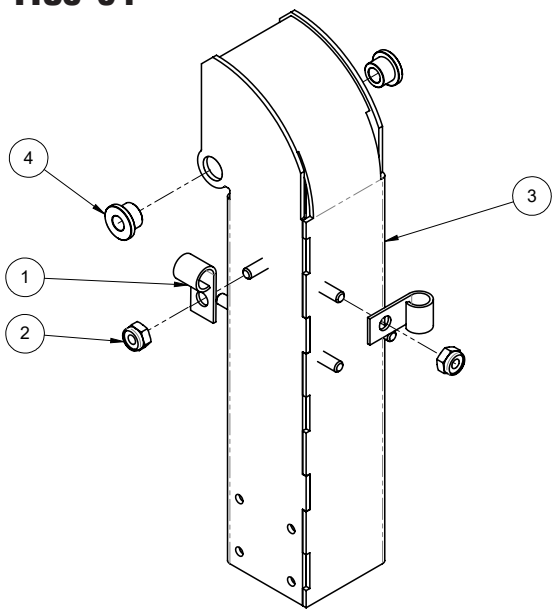
5.68 SCOOP HOOD ASSEMBLY

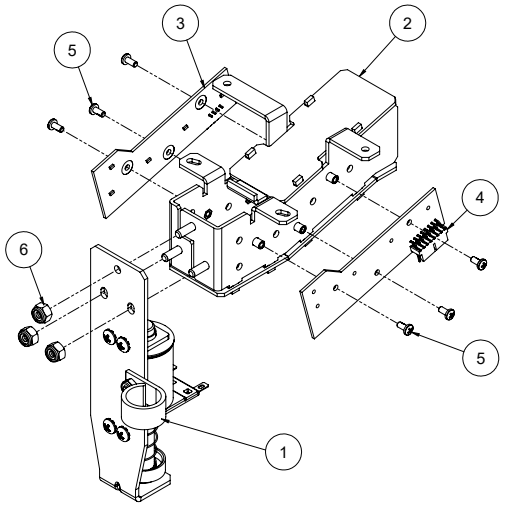
511-1185-04



ID	Part Number	Description	Qty
1	040-5000-03	1/4" CABLE CLAMP	2
2	240-5005-00	6-32 NYLON STOP NUT	2
3	515-3003-02	SCOOP CHUTE	1
4	283-5018-03	3/16 ID X 5/16 OD X 1/4 LG. BUNTING SAE 841 BRONZE FLANGED BEARING - PART #EF030504	2

5.69 DRAGON BALL LOCK ASSEMBLY

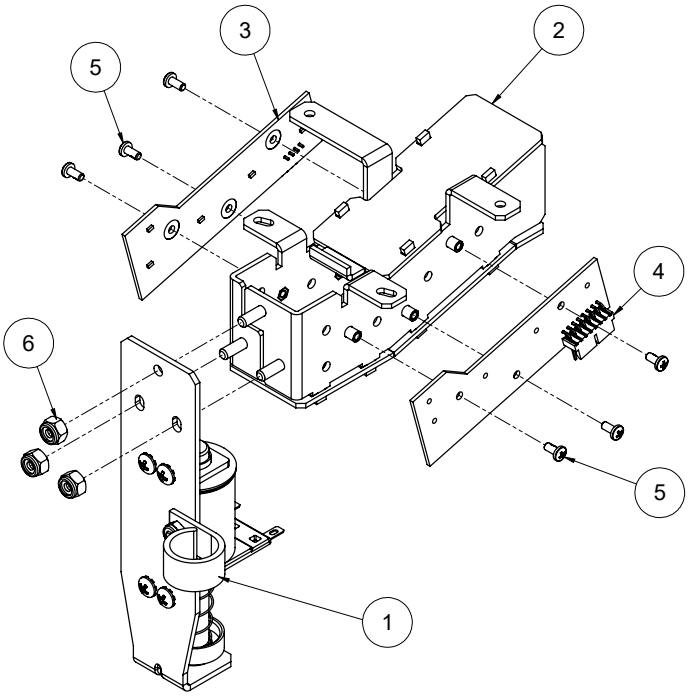
511-1185-00



ID	Part Number	Description	Qty
1	511-1184-00	DRAGON VUK ASM	1
2	515-3003-00	DRAGON BALL LOCK CHUTE	1
3	520-8658-00	PCB, 5 OPTO TRANSMITTER	1
4	520-8659-00	PCB, 5 OPTO RECEIVER	1
5	237-6169-00P	SCREW, 4-40 X 1/4 PPH MS, PATCH	6
6	240-5102-00	8-32 NYLON LOCK NUT	3

5.70 DRAGON VUK ASSEMBLY

511-1184-00



ID	Part Number	Description	Qty
1	515-7309-00	PLUNGER ASSEMBLY	1
2	535-5203-03	COIL RETAINING BRACKET	2
3	535-5508-00	BRACKET, VUK	1
4	090-5001-ND	COIL, 23-800, NO DIODE	1
5	040-5000-08	WIRE CLIP, 3/4" OPEN TAB	1
6	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	4
7	240-5005-00	6-32 NYLON STOP NUT	1
8	266-5020-00	COMPRESSION SPRING-CONICAL	1
9	545-5076-01	COIL SLEEVE	1
10	545-5105-00	RUBBER BUMPER	1

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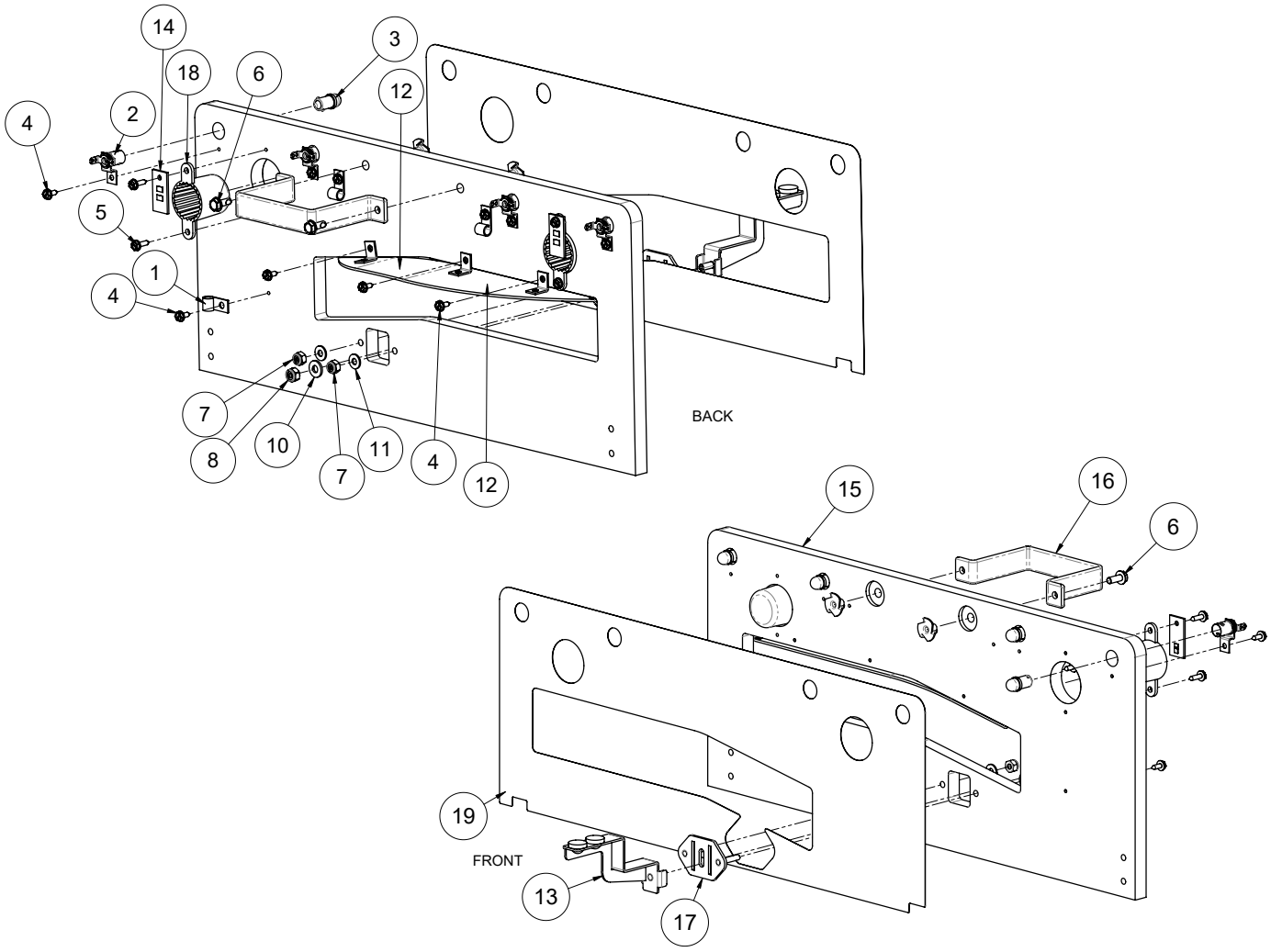
5.71 BACK PANEL ASSEMBLY

500-2670-00



ID	Part Number	Description	Qty
1	040-5000-03	1/4" CABLE CLAMP	3
2	077-5223-00	SOCKET 2 V/LUG SHORT	4
3	112-5034-08	DOUBLE LED, BAYONET BASE	4
4	234-5000-00	SCREW, #6 X 3/8" HWH	10
5	234-5001-02	SCREW, #6 X 1/2" HWH	4
6	237-5995-00P	SCREW, 10-32 X 1/2" HWH SERR MS ZI, PATCH	2
7	240-5102-00	8-32 NYLON LOCK NUT	2
8	240-5203-00	10-32 NYLON LOCK NUT	1
9	240-5204-00	#10-32 T-NUT, 3 PRONG	2
10	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	1
11	242-5005-00	#8 WASHER .187 ID X.437 OD X .047	2

ID	Part Number	Description	Qty
12	510-7974-18	RIVETED ASY, PLASTIC -18, DUNGEONS & DRAGONS	1
13	511-0031-00	ASSEMBLY CUBE RAMP SUPPORT, DUNGEONS & DRAGONS	1
14	520-7000-00	SINGLE FLASH LED BOARD	2
15	525-9803-00	BACK PANEL, DUNGEONS & DRAGONS	1
16	535-2288-00	HANDLE, BACKPANEL	1
17	535-3325-00	ADJUSTMENT PLATE, DUNGEONS & DRAGONS	1
18	550-5031-03	MINI MARS W/EARS- AMBER SB	2
19	820-7958-50	DECAL, BACK PANEL -50, DUNGEONS & DRAGONS	1

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6. SPECIFICATIONS

500-55X8-01

SPECIFICATIONS, MECHANICAL, GAME SETUP

Specification	Imperial	Metric
Weight	210 lbs	96 kg
Max dimensions, leg levelers extended (h, w, d)	78 x 27.75 x 57 in	198 x 70.5 x 145 cm
Minimum game dimensions (h, w, d)	76 x 27.75 x 57 in	193 x 70.5 x 145 cm
Minimum room dimensions per game (h, w, d)	80 x 36 x 84 in	203 x 91 cm x 214 cm

- (h, w, d) = height, width, depth.

SPECIFICATIONS, MECHANICAL, BOXED

Specification	Imperial	Metric
Weight, boxed (without pallet)	230 lbs	105 kg
Box dimensions (h, w, d)	56.5 x 31 x 31 in	144 x 79 x 79 cm
Minimum dimensions (h, w, d)	76 x 26 x 57 in	193 x 66 x 145 cm

- (h, w, d) = height, width, depth.

SPECIFICATIONS, ELECTRICAL

Specification	North America - 120VAC	International - 240VAC
Line Voltage, Nominal	120 VAC	240 VAC
Line Voltage Range	90 VAC - 250 VAC	90 VAC - 250 VAC
Line Frequency *	60 Hz	50 Hz, 60 Hz
Line Power, Current - attract mode	70 W, 0.6 A @ 120 VAC	70 W, 0.3 A @ 240 VAC
Line Power, Current - nominal	360 W, 3 A @ 120 VAC	360 W, 1.5 A @ 240 VAC
Line Power, Current - peak, <100 ms	540 W, 4.5 A @ 120 VAC	540 W, 2.25 A @ 240 VAC

* NOTE: Games designed for 60hz operation (e.g. North America games) will not function correctly on 50hz power and vice versa.

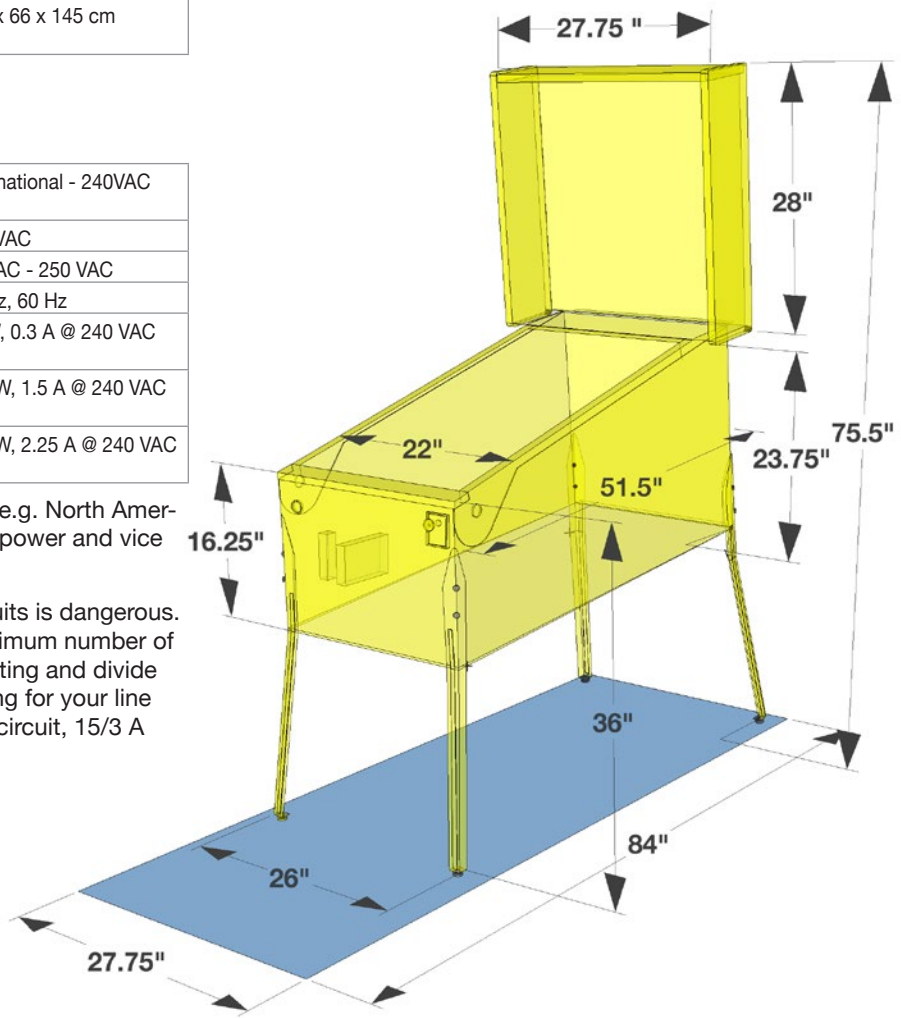
WARNING: Overloading electrical supply circuits is dangerous. Do not overload circuits. To calculate the maximum number of games for a circuit, check circuit amperage rating and divide by the game Nominal Line Power Current rating for your line voltage. For example, a 15A 120V household circuit, 15/3 A (nominal current) = 5 games maximum.

SPECIFICATIONS, ENVIRONMENT

	Minimum	Maximum
Temperature, Operating	32 °F / 0 °C	104 °F / 40 °C
Temperature, Storage	32 °F / 0 °C	104 °F / 40 °C
Relative Humidity, Operating	5%	95% non-condensing
Relative Humidity, Storage	5%	95% non-condensing

- (a) "The appliance has to be placed in a horizontal position."
- (b) If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified person in order to avoid hazard.

6.1 GAME DIMENSIONS



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6.2 WARRANTY

Stern Pinball machines are assembled in Elk Grove Village, Illinois, USA; each pinball machine has unique characteristics that make it a one-of-a-kind American-made product. Each machine will have variations in appearance resulting from differences in the machine's particular wood parts, individual silk screened art and mechanical assemblies. Stern Pinball has inspected each game element to ensure it meets stringent quality and playability standards.

STERN PINBALL INC LIMITED WARRANTY

For warranty information, please visit:

sternpinball.com/support/warranty

ATTENTION! IMPORTANT WARRANTY INFORMATION

The electronics system, node network architecture, mechanical devices and associated software control systems in this pinball machine are designed to work with genuine Stern Pinball accessories and devices.

Installation of non-authorized accessories, lamps, LED's, motors or other devices or modification of electro-mechanical devices may damage the system and may void your warranty.

6.3 WARNINGS, COMPLIANCE, AND LEGAL NOTICES

PHOTOSENSITIVE SEIZURES HEALTH WARNING

A very small percentage of people may experience a seizure when exposed to certain visual images, including flashing lights or patterns. Even people with no history of seizures of epilepsy may have an undiagnosed condition that can cause "photosensitive epileptic seizures" due to certain visual images, flashing lights or patterns. Symptoms can include lightheadedness, altered vision, eye or face twitching, jerking or shaking of arms or legs, disorientation, confusion, momentary loss of awareness, and loss of consciousness or convulsions that can lead to injury from falling down or striking nearby objects.

IMMEDIATELY STOP PLAYING AND CONSULT A DOCTOR IF YOU EXPERIENCE ANY OF THESE SYMPTOMS.

PARTS SUBSTITUTIONS

For safety and reliability, substitute parts and equipment modifications are not recommended and may void any and all warranties. Use of Non-Stern Pinball Inc Parts or Modifications of game circuitry may adversely affect game play or game safety. Transport pinball machines with hinged backbox in the down position only! Always take great care when servicing any game. Always read the service manual before replacing or servicing components. Substitutions of parts or equipment modifications may void FCC type acceptance.

Always disconnect the line voltage before servicing. Some parts may remain energized when unplugged. Take great caution when servicing any electrical components.

PERCHLORATE MATERIAL - Special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

FCC CLASS A SUBPART J COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF INTERFERENCE NOTICE

The cable harness placements, ground strap routing, and other shielding have been designed to keep RF radiation and conduction within levels accepted by FCC rules. To maintain these levels, factory harness position, shielding, and ground straps must be installed in their factory locations should they become disconnected during maintenance.

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b. "Stern Pinball Software" means software (including but not limited to firmware) pre-installed in the Stern Pinball Machine, including all Authorized Content and any Authorized Updates that Stern Pinball may make available to You from time to time.

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f. "Unauthorized Software" means any software (including but not limited to firmware) not pre-installed by Stern Pinball on a Stern Pinball Machine or that does not comprise Authorized Content or Authorized Update.

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